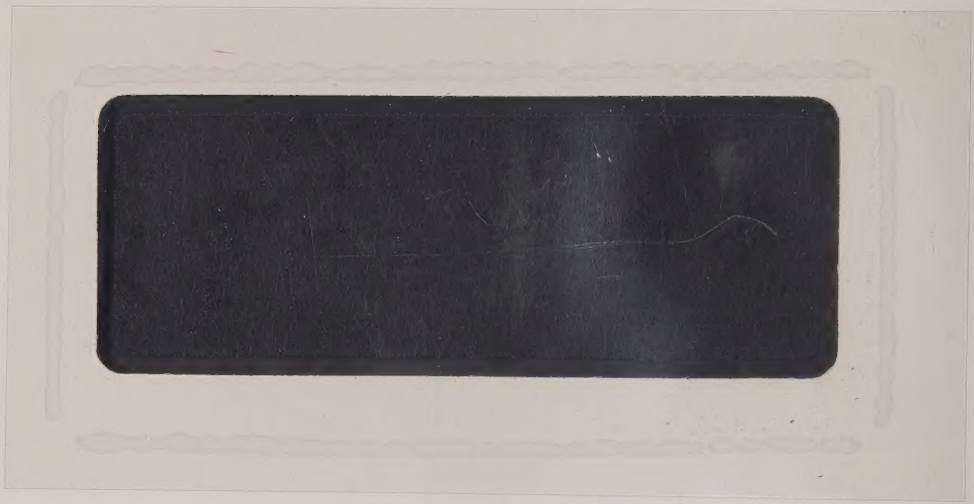
XR-70

PORTABLE CASSETTE DATA RECORDER

TEAC®



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PORTABLE CASSETTE DATA RECORDER

SERVICE MANUAL

TEAC CORPORATION, JAPAN P/N 10180247-00

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SECTION 1
GENERAL DESCRIPTION

The TEAC's XR-70 Cassette data recorder is the data recorder for 21 channels + memo designed for higher precision mechanism with the base of XR-30/50.

This data recorder is the combined data recorder of merits of both open-reel type and the compact cassette type, such as compact size, lighter in weight, and reproduction as well as multi-channel recording.
In operation mechanism, microcomputers are wholly utilized, and operation-error check can be made. Thus this data recorder can be widely used regardless of indoor or outdoor with higher reliability, vibration resistance and universal utility.

— Features —

1) Easily handling cassette tape:

   In XR-70 Cassette Data Recorder, magnetic tape is housed in the cassette half, similar to the compact cassette and L-cassette. Accordingly, there is no worry to touch the tape-sureface, and tape can be easily carrierd, also, the mounting and dismounting can be made very conveniently.

2) Multi-channel recording and reproducing can be performed:

   XR-70 Cassette Data Recorder is the recorder of 21-channels + memo, and it is mounted with easily operable recording and play-back amplifier as standards.
   Level adjustment for input or output can be operated independently for each channel, and most necessary functions for recording and play-back are available on the front panel.

3) Employment of microcomputer:

   For control mechanism, microcomputers are adopted wholly, thus reliability is enhanced, and it is possible to make error check by the operation mistake. Thereby, data-recording and reproducing can be easily done without error.

4) FM-recording system:

   Standard equipment is made with FM (frequency modulation) recording/reproducing amplifier (ISO, Wide Band Group-1).

5) Preset-possible direct reading electronic linear counter:

   It is equipped with a highly precise electronic linear counter adopted for SR-series data recorder instead of the conventional mechanical counter.

6) Recording/reproducing monitor:

   Unlike the compact cassette data recorder, recording/reproducing head is prepared independently, thereby, it is possible to monitor the recording/reproducing simultaneously. With the monitor, optional selection can be made for each channel, and peak display can be made by level meter and monitor terminal. Further, monitor is possible for the final output by selector of the internal switch.

7) Tape-driving section:

   The mounting of tape housed in the cassette case can be exactly done by the check system of micro-computer and the unique loading motor system. Tape-running part is operated stably by 3-motor dual capstan closed roop system, and it has the equal permormance of antivibration as that of the already reputed R-260 and R-280 Series.

8) Recording/reproducing of FM-wide range:

FM-recording/reproducing frequency characteristics are as wide as the band (ISO, Wide Band Group - 1) as in the following:

19.05cm/s (7-1/2ips) DC ~ 5kHz
9.52cm/s (3-3/4ips) DC ~ 2.5kHz
4.76cm/s (1-7/8ips) DC ~ 1.25kHz
2.38cm/s (15/16ips) DC ~ 625Hz

9) Tape-servo controller:

With the standing equipment of tape servo controller for improving the time-base error, jitter or dynamic skew, exact data-recording/reproducing can be done.

10) 4-speed of tape:

Tape can be operated by the following 4 speeds, and the designated speed can be displayed on LLD-table at each time selecting the speed.

19.05cm/sec	(7-1/2ips)	Approx. 22 minutes
9.52cm/sec	(3-3/4ips)	Approx. 43 minutes
4.76cm/sec	(1-7/8ips)	Approx. 1 hour & 27 minutes
2.38cm/sec	(15/16ips)	Approx. 2 hour & 54 minutes

NOTE: Recording time in the use of standard tape (T-120)

11) Remote function connected easily with outside-equipment:

With the preparation of the REMOTE/LOCAL selector SW, it is possible to control this data-recorder and the switching of the speed from the outside equipment.

1-1 SPECIFICATIONS 1

Recording/reproducing system	:	FM or DR (DR is option)
Using tape	:	Japan Electronic Ind. Assoc. Spec. 1/2 inch recording tape (T-120) - Tape length: 248m - Tape width : 12.7mm (1/2inch)
Number of channels	:	21 channels + 1 memo channel CH1 ~ 10 special use for data, CH12~21 special use for data, CH11 data-noise compensation combined use with tape servo
Head composition	:	Recording/reproducing: each 1 set Erase: 1 piece
Control	:	POWER Push-button switch REWIND, F.FWD, FWD, STOP, RECORD, EJECT Push - button switch Tape-speed selector by rotary-switch *The above control can be made for remote control exact "POWER" and "EJECT".
Tape speed	:	4 speeds 19.05cm/sec (7-1/2 ips) 9.52cm/sec (3-3/4 ips) 4.76cm/see (1-7/8 ips) 2.38cm/sec (15/16 ips)
Tape - speed accuracy	:	Less than ±0.2%
Flutter (In conformity with IRIG 107-73 STD)	:	Less than 0.35%p-p at 19.05cm/sec Less than 0.45%p-p at 9.52cm/sec Less than 0.55%p-p at 4.76cm/sec Less than 0.7 %p-p at 2.38cm/sec
Calibration voltage	:	DC ±1V, 0V
Start/Stop time	:	approx. 2 seconds
Fast winding time/rewinding time	:	approx. 5 min. at 248m length tape
Continuous recording/reproducing Time	:	about 3 hrs at 2.38cm/sec speed
Input voltage	:	±1V~ ±10V (Continuously variable)
Input impedance	:	1M ohm
Output voltage	:	0 ~ ±2V (100k ohm load, continuously variable)
Output current	:	±10mA (20 ohm load)
Zero output	:	±10% (Shift possible)
Channel selection display	:	Front panel, LED display for each channel

SPECIFICATIONS 2

Tape speed display : Front-panel LED display

Tape counter : Electronic linear counter

Frequency response, Signal-to-Noise Ratio and Recording time:

Tape speed	Frequency response +0.5dB -1.0dB	S/N Ratio (COMP ON) rms	Recording time
19.05cm/sec	DC ~ 5kHz	50dB	about 21 minutes
9.52cm/sec	DC ~ 2.5kHz	48dB	about 43 minutes
4.76cm/sec	DC ~ 1.25kHz	47dB	about 1 hour & 27 minutes
2.38cm/sec	DC ~ 625Hz	46dB	about 2 hour & 54 minutes

Distortion : FM high harmonic wave, Less than 1%

Crosstalk : Each channel, Less than noise level

Linearity : Less than ±0.5%

Drift : Heat run after 30 minutes, Less than ±0.5%

Environmental : Temperature: 0°C~40°C
Humidity : 20%~80%

Source voltage (power) : 12V DC (11V to 15V DC) about 6A
Also, applicable 24V DC

Weight : about 23kg

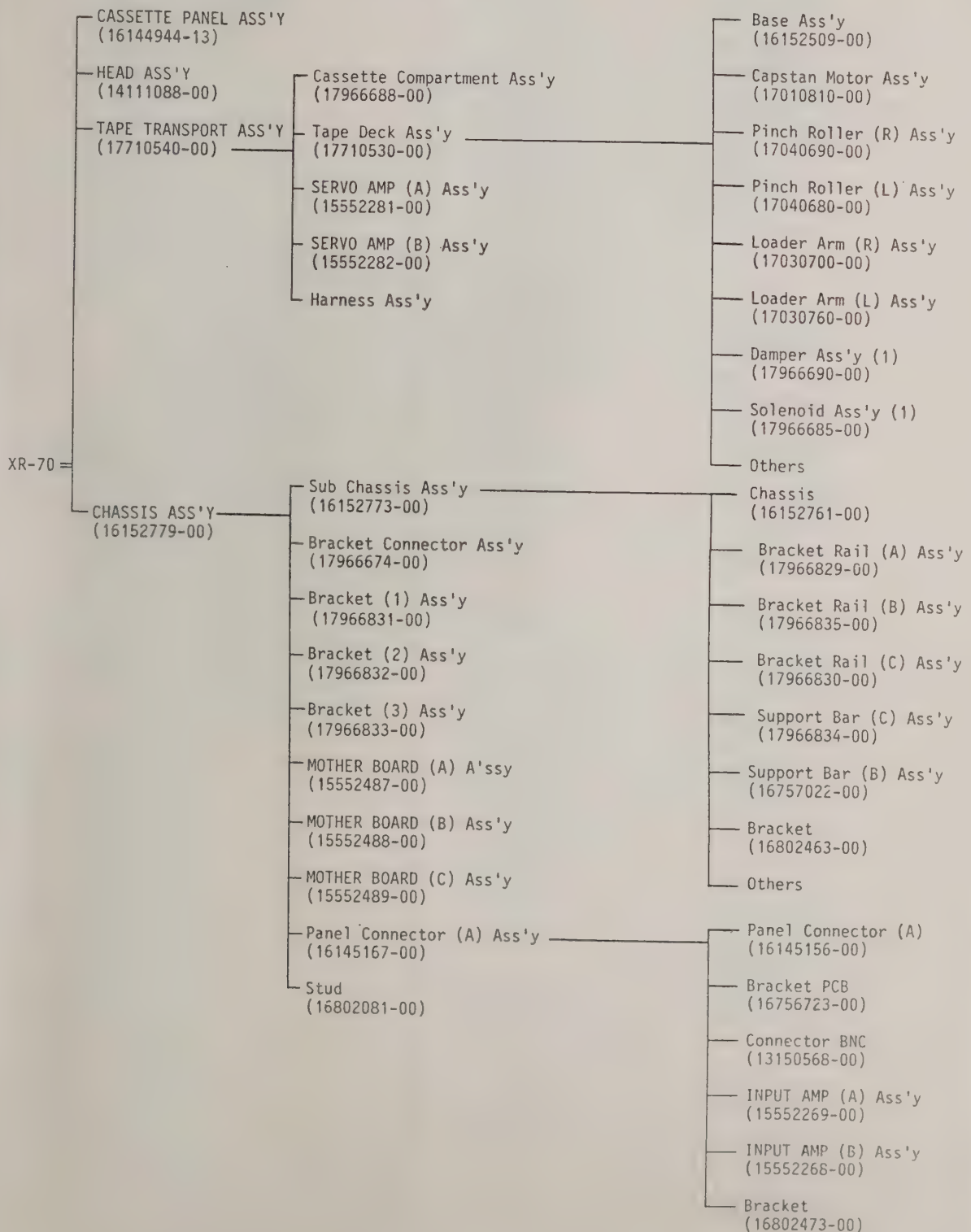
External dimensions (W x H x D) : 450 x 382 x 192mm (approx.)

STANDARD ACCESSORIES

- Magnetic tape 1
  (1/2" cassette tape)
- Input/output cord 43
- Power supply cable 1
- Microphone 1
- Earphone 1
- Fuse 10A 1
- Small screw driver and holder.. 1
- Creaner 1
- Instruction manual 2

SECTION 2
EXPLODED VIEW AND PARTS LIST

2-1 ASSEMBLY STRUCTURE DIAGRAM-1



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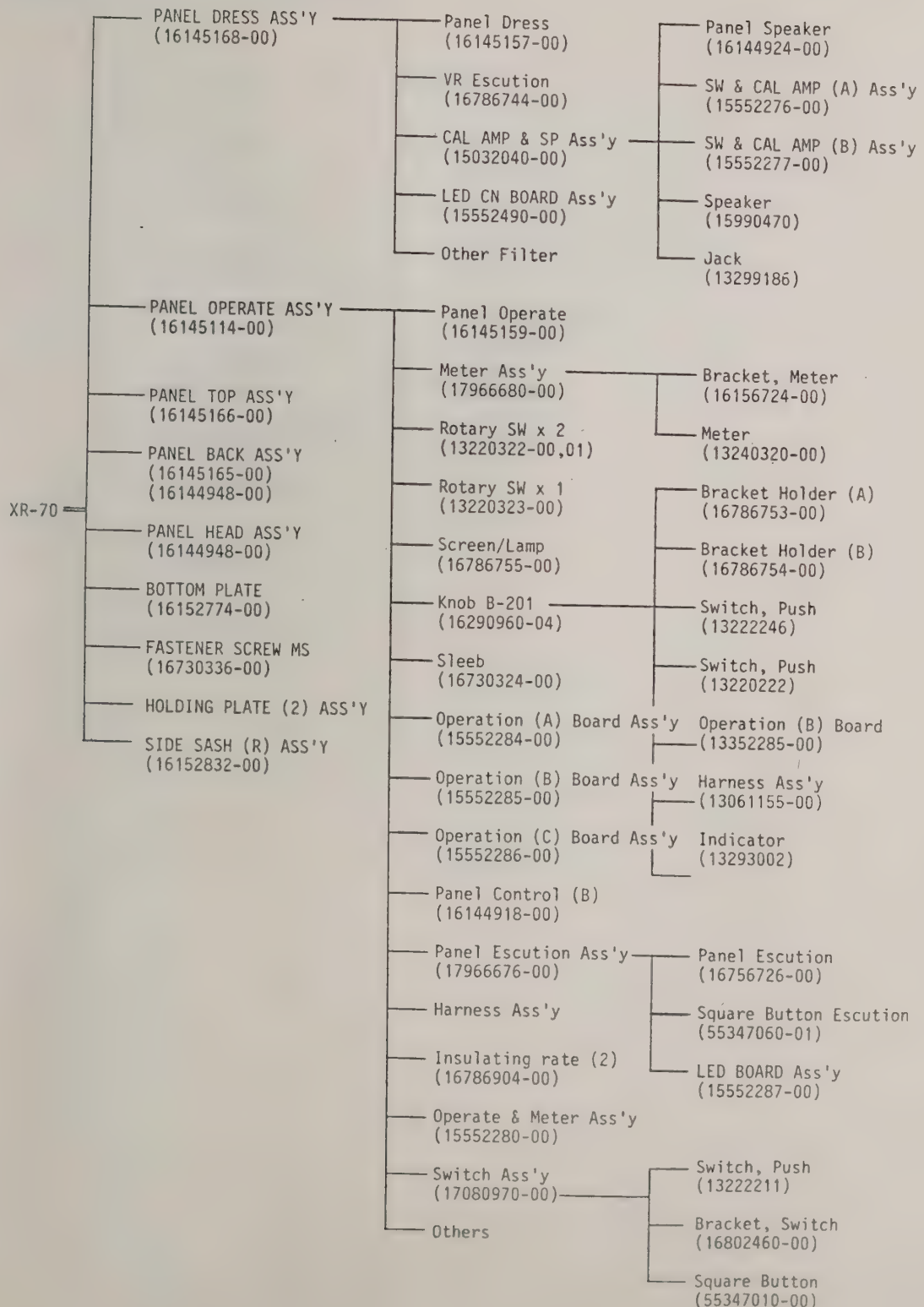
ASSEMBLY STRUCTURE DIAGRAM-2



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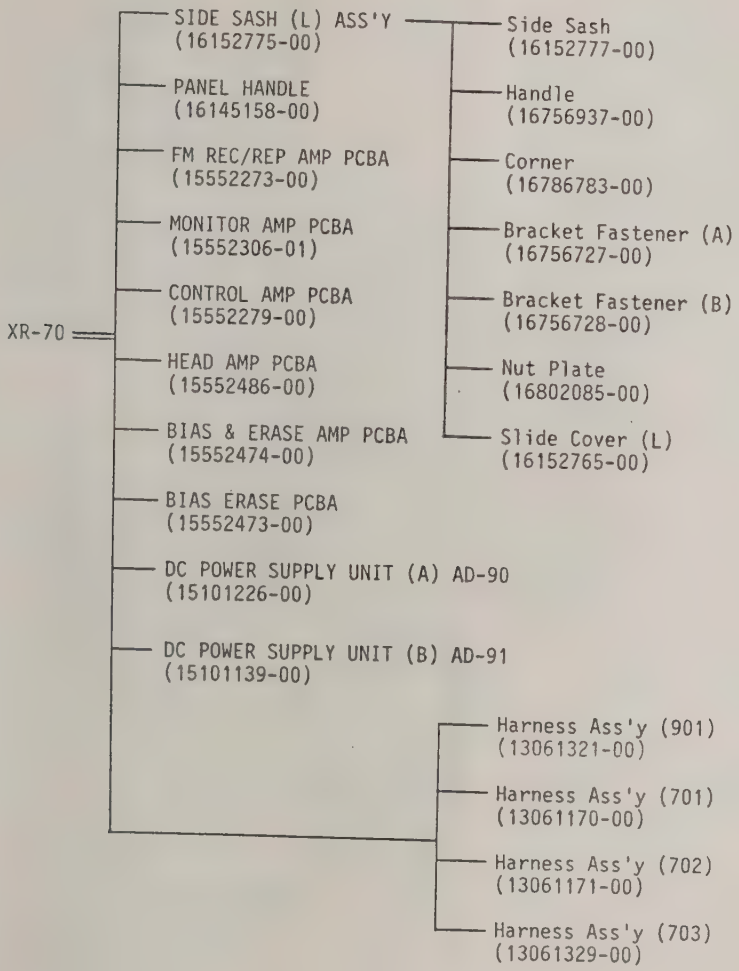
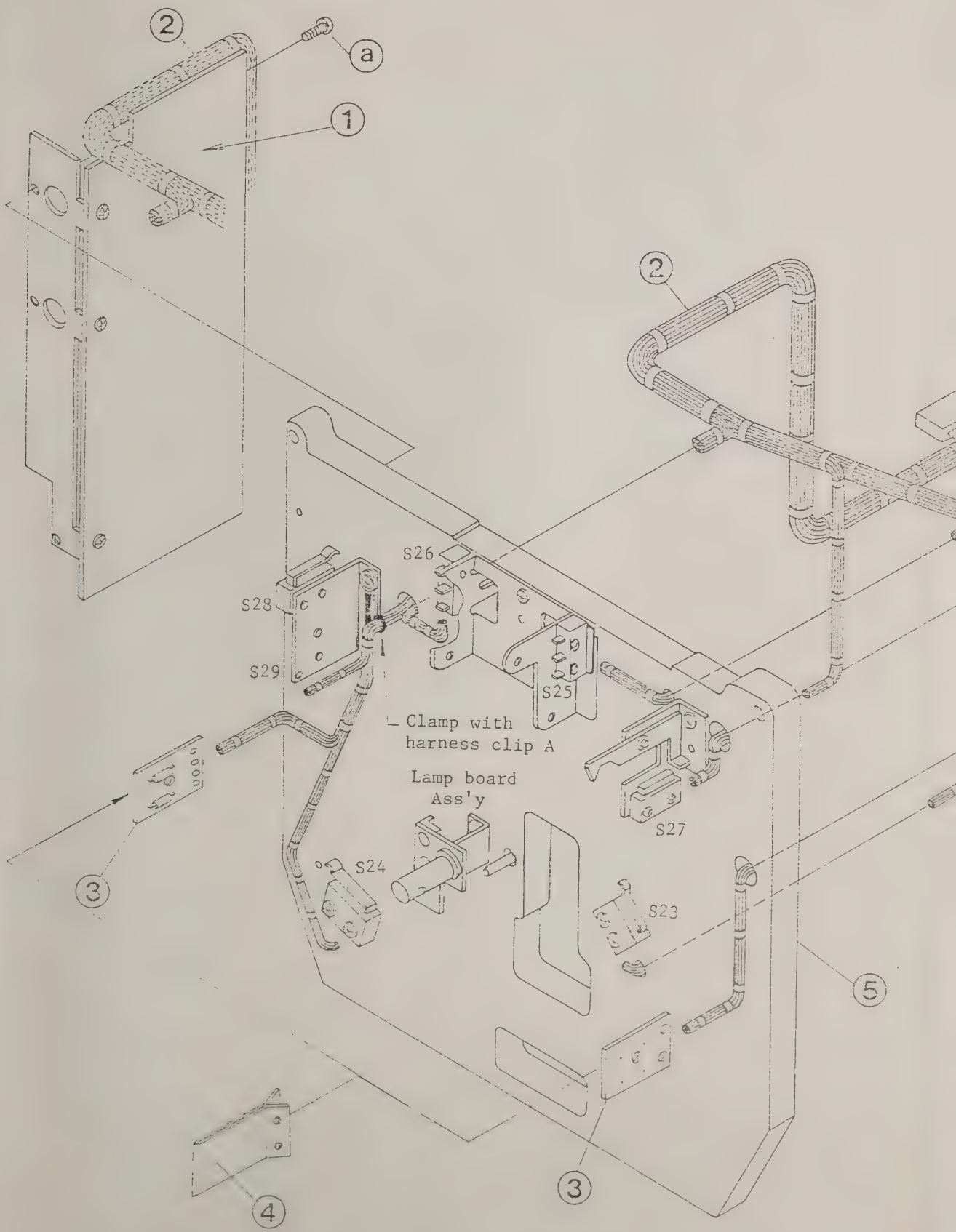
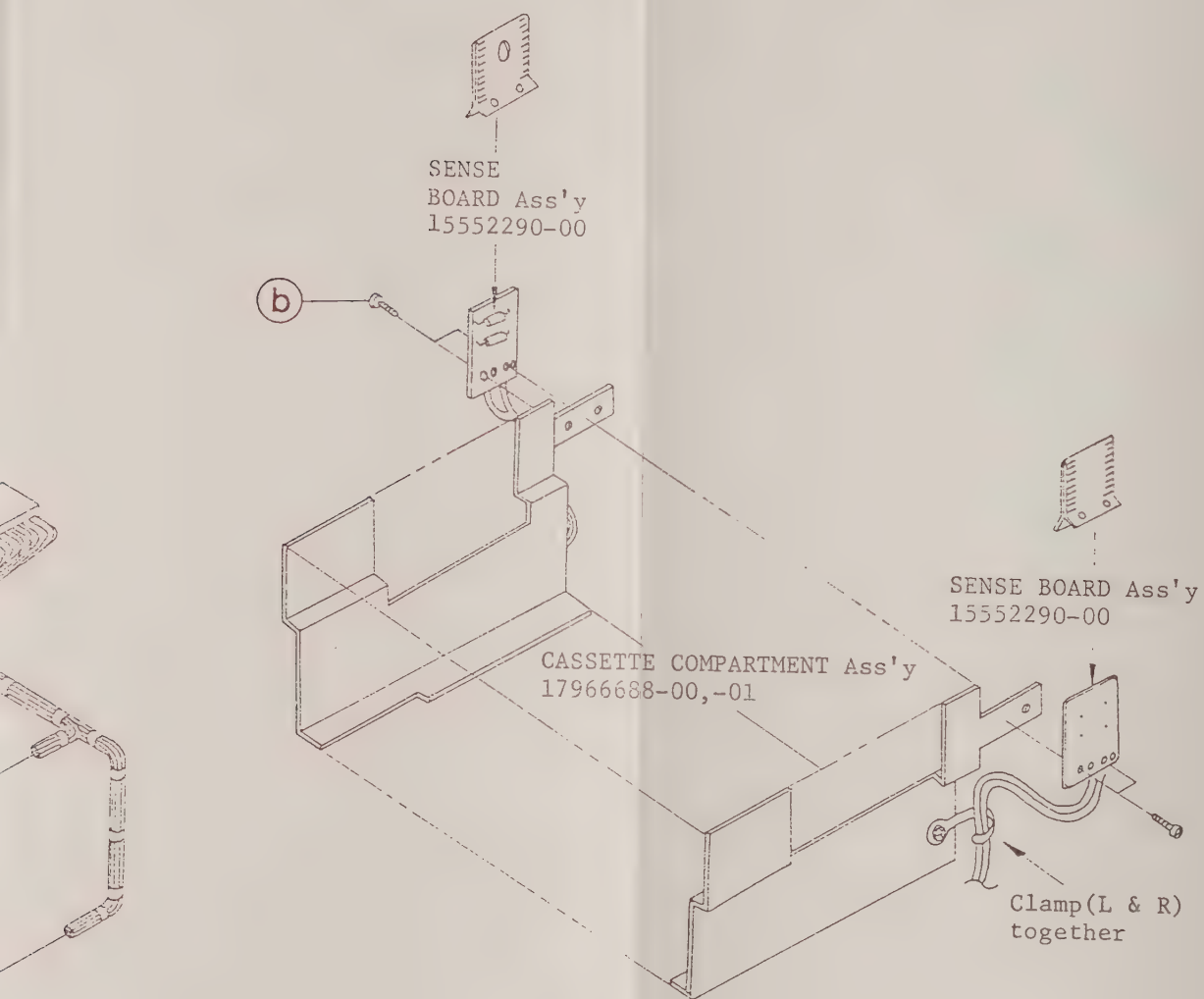
ASSEMBLY STRUCTURE DIAGRAM-3



2-2 TAPE TRANSPORT ASS'Y EXPLODED VIEW

2-2-1 Tape Deck Ass'y (17710530-00)-1 — Exploded View and Parts List —

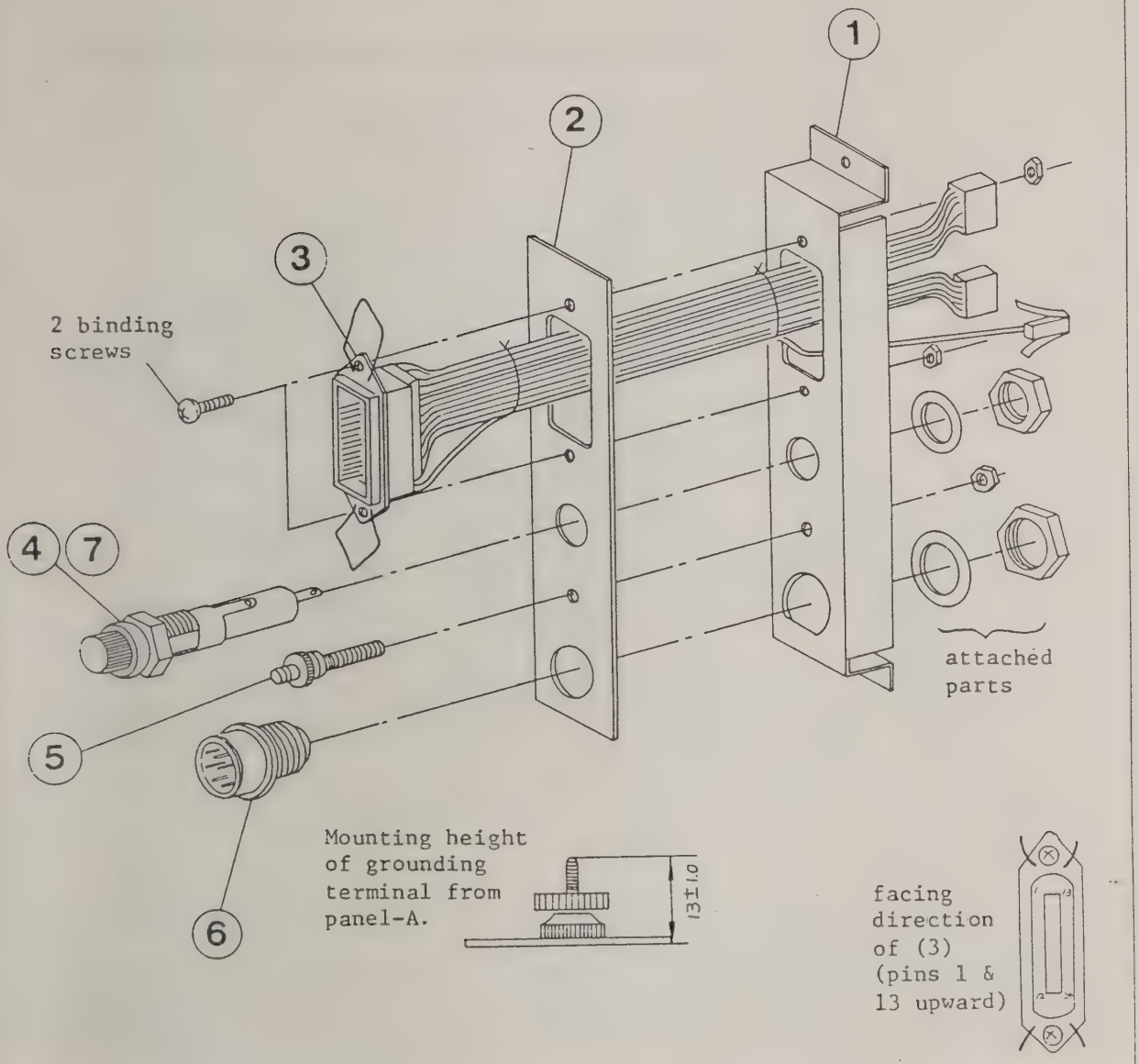




Parts marked with an * require longer delivery time.

EF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
1	15552281-00	SERVO AMP ass'y (A)	1	
2	13061174-00	Harness Ass'y (405)	1	*
3	15552290-00	Sense-Board Ass'y	2	*
4	16786875-00	Sense-Baord Cover	1	*
5	17710530-00	TAPE DECK Ass'y	1	*
a)	16470308	pan head screw SEMS 3x8	1	
b)	16411004	binding screw 2.6x4	2	

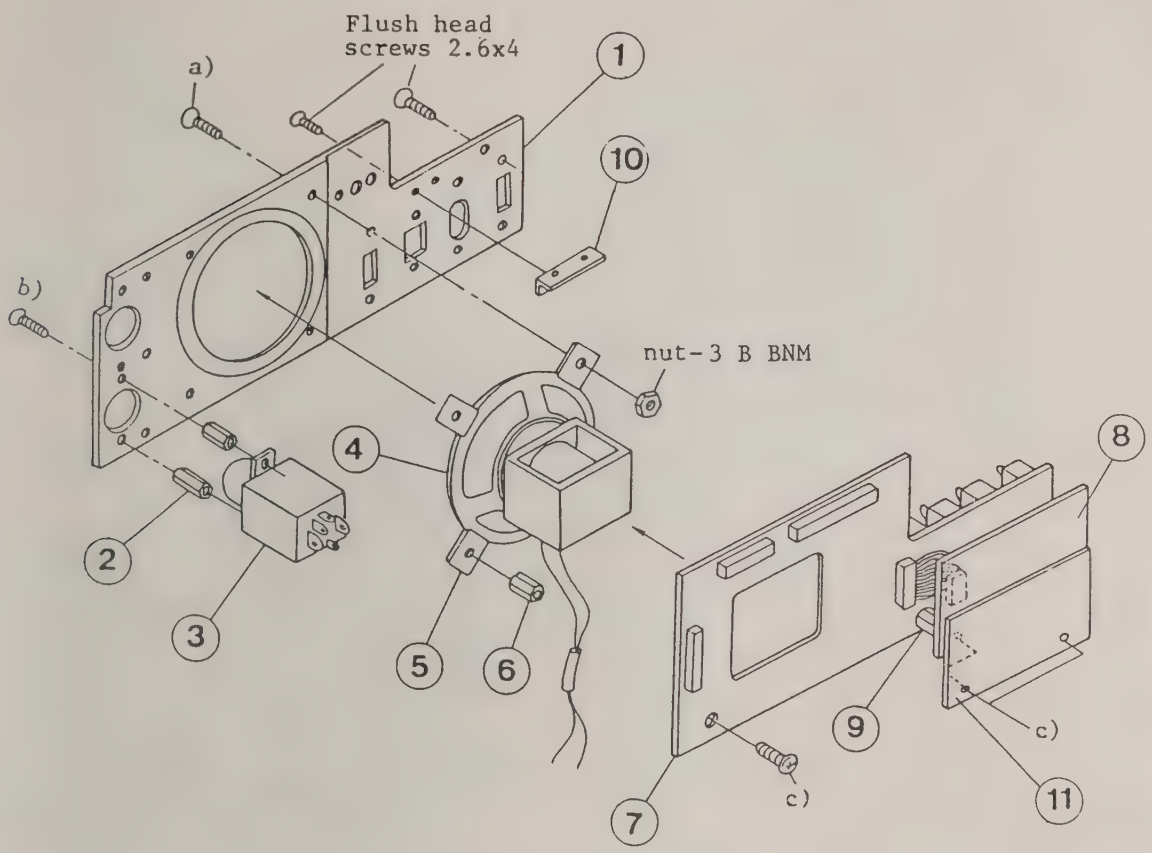
2-2-2 Connector Bracket Ass'y (17966674-00) — Exploded View and Parts List —



Parts marked with an • require longer delivery time.

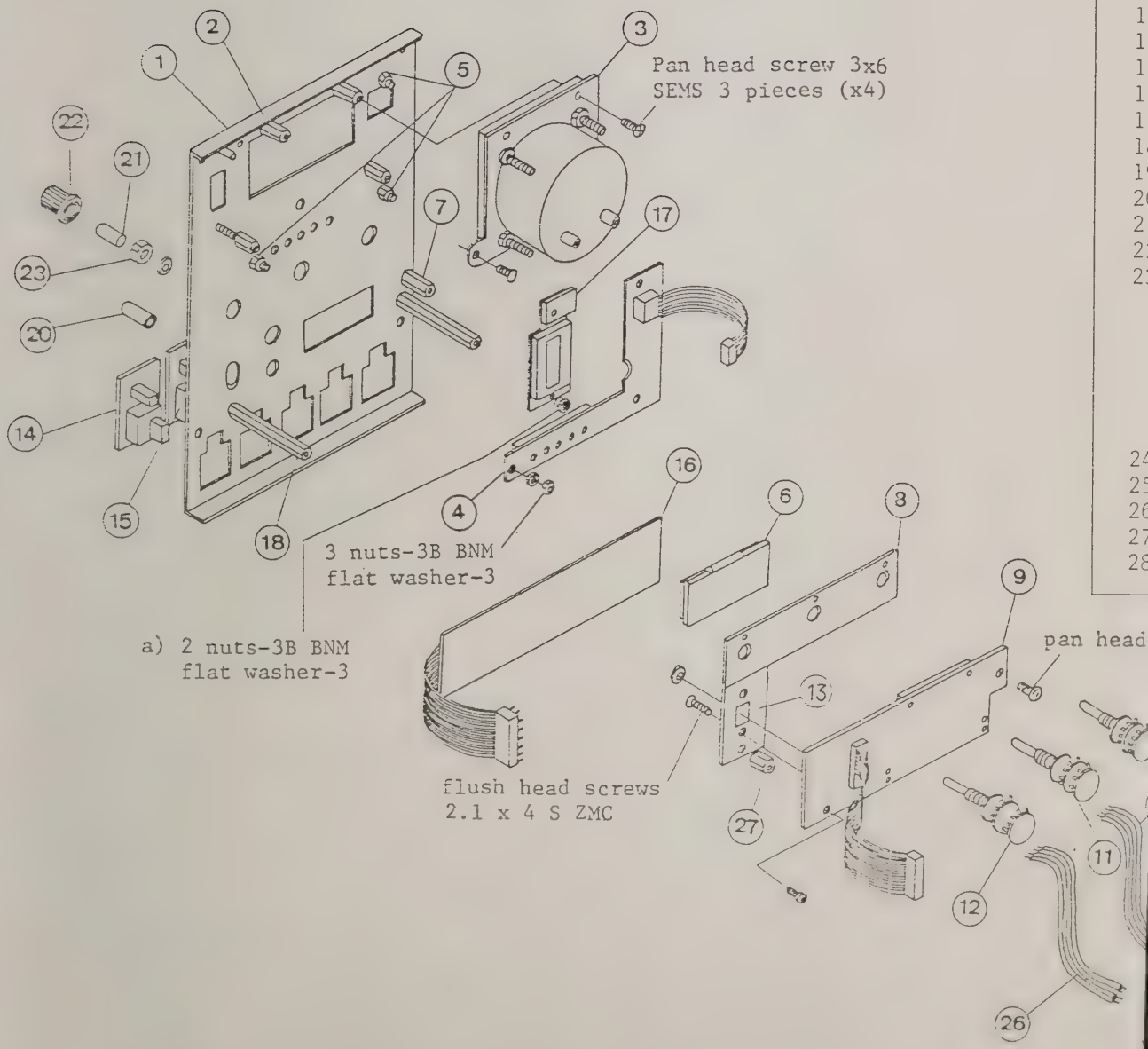
REF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
1	16756725-00	Connector bracket	1	*
2	16144919-00	Control panel (A)	1	*
3	13061151-00	Harness Ass'y (117)	1	*
4	13291388	Fuse holder X-N2065	1	*
5	13180000	Grounding terminal TM-355	1	
6	13100957	Connector RM15QR-4P	1	
7	13291230	Fuse 5A	1	
	16490002	Nut M2.6 B BNM	2	
	16411008	Binding screw 2.6x8 B BNM	2	

2-2-3 CAL & SPKR Ass'y (15032040-00) — Exploded View and Parts List —



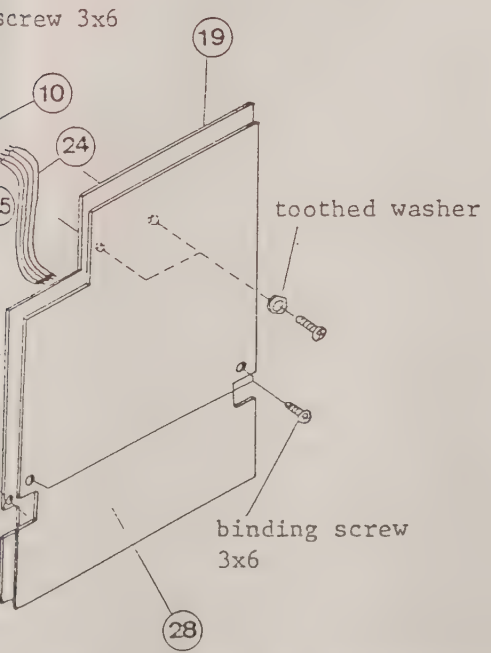
Parts marked with an • require longer delivery time.

REF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
1	16144924-00	Speaker panel	1	
2	16359286-00	Pole-A l=4.5	4	
3	13299186	Jack	2	
4	15990470	Speaker EAS-6P60S	1	
5	16802083-00	Speaker bracket	4	
6	16359150	Pole l=10 S-1	1	
7	15552276-00	SW & CAL AMP-(A) Ass'y	1	
8	15552277-00	SW & CAL AMP-(B) Ass'y	1	
9	16359158	Pole l=18 S-9	2	
	16421004	Flush head screw 2.6x4 B BNM	10	
	16490004	Nut 3 B BNM	3	
a)	16420308	Flush head screw 3x8 S ZMC	4	
b)	16420312	Flush head screw 3x12 S ZMC	4	
c)	16411306	Binding screw 3x6 B BNM	5	
10	16756782-00	PCB bracket (3)	1	
11	16786909-00	Insulating plate (3)	1	

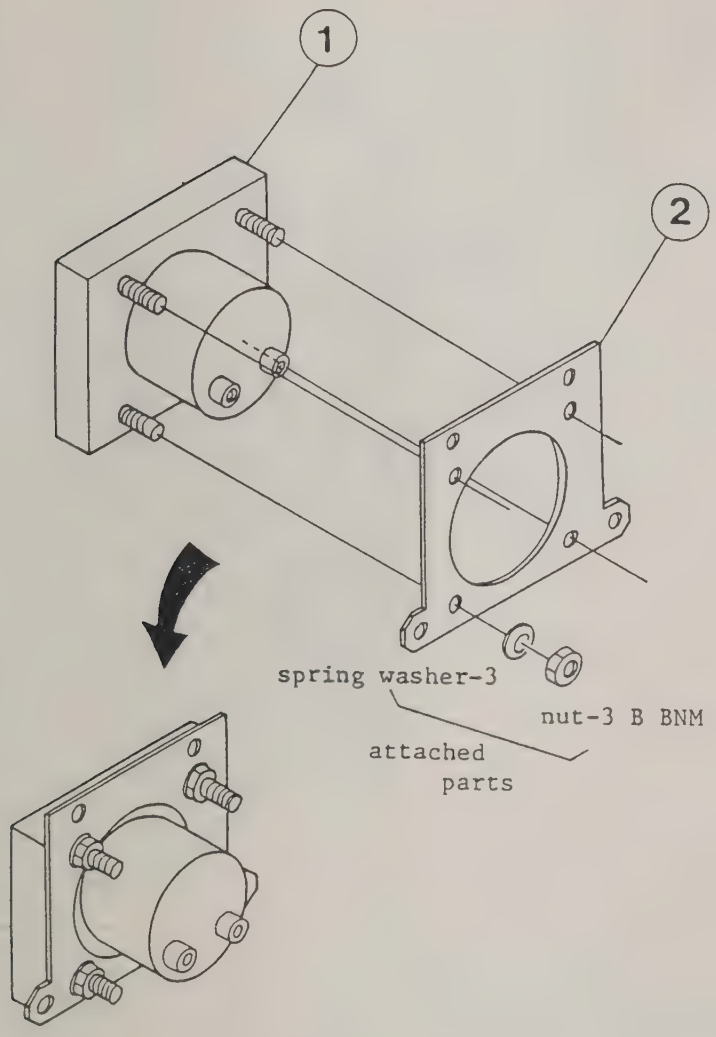

Pan head screw 3x6
SEMS 3 pieces (x4)
3 nuts-3B BNM
flat washer-3
a) 2 nuts-3B BNM
flat washer-3
flush head screws
2.1 x 4 S ZMC
pan head

Parts marked with an * require longer delivery time.

NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
	16144925-00	Operate Panel	1	*
	16359150	Pole 1=10 S-1	4	*
	17966680-00	Meter Ass'y	1	*
	15552286-00	Operation Board Ass'y (C)	1	*
	16359287-00	Pole 1=3.5	3	*
	16786755-00	Lamp screen	1	*
	16359154	Pole 1=4 S-5	1	*
	16144918-00	Control Panel (B)	1	*
	15552285-00	Operation Board Ass'y (B)	1	
	13220322-00	Rotary switch M2203	1	
	13220323-00	Rotary switch M1205	1	
	13220218-00	Rotary switch M2107	1	
	16786756-00	Cover plate (A)	1	*
	13222239	Push swich (R)	1	
	13222245-00	Push switch (W)	4	
	15552284-00	Operation Baord Ass'y (A)	1	
	17966676-00	Escutcheon panel Ass'y	1	
	16359180	Pole 1=40 S-31	2	
	15552280-00	OPERATE & METER AMP Ass'y	1	
	55440400-00	Lever knob (C)	1	
	16730324-00	Sleeving	3	
	16290960-04	Knob B-20J	3	
	16492147-00	Nut M7x0.75	3	
	16496082	Toothed washer 3	2	
	16421004	Flush head screw 2.1x4 S ZMC	1	
	16496094	Flat washer 3x6x0.5	5	
	16490004	Nut 3 B BNM	5	
	16498579	Pan head screw in 3-piece, 3x6	6	
	16411306	Nickel binding 3x6	4	
	13061156-00	Harness Ass'y (203)	1	*
	13061157-00	Harness Ass'y (204)	1	*
	13061158-00	Harness Ass'y (205)	1	*
	16359152	Pole 1=12 S-3	1	
	16786904-00	Insulator plate (2)	1	*



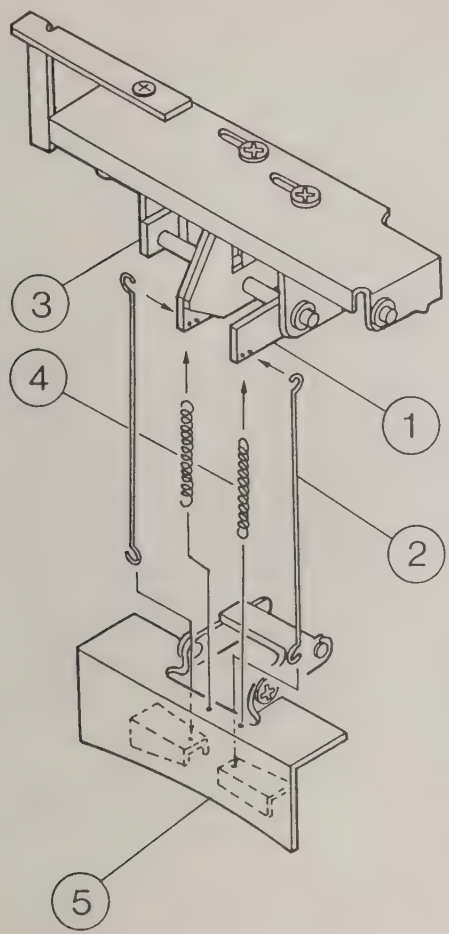
2-2-5 Meter Ass'y (1796680-00) — Exploded View and Parts List —



Parts marked with an * require longer delivery time.

REF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
1	13240320-00	Meter	1	
2	16756724-00	Meter bracket	1	*

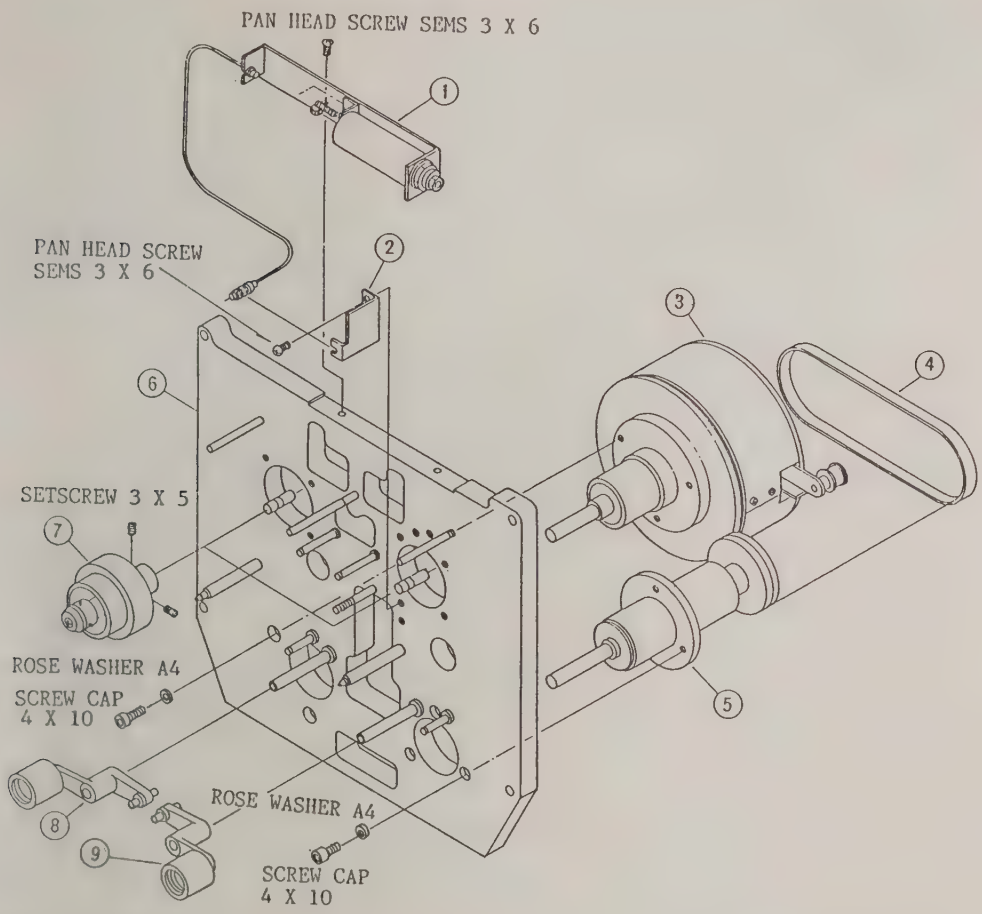
2-2-6 Tape Deck Ass'y-2 — Exploded View and Parts List —



Parts marked with an * require longer delivery time.

REF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
1	16792219-00	Link P-L	1	*
2	16766477-00	Rod 1 x 81.5	2	*
3	16792220-00	Link P-R	1	*
4	16381073-00	Spring T4.3 x 0.27	2	*
5	17966682-00	Hop-up Ass'y (1)	1	*

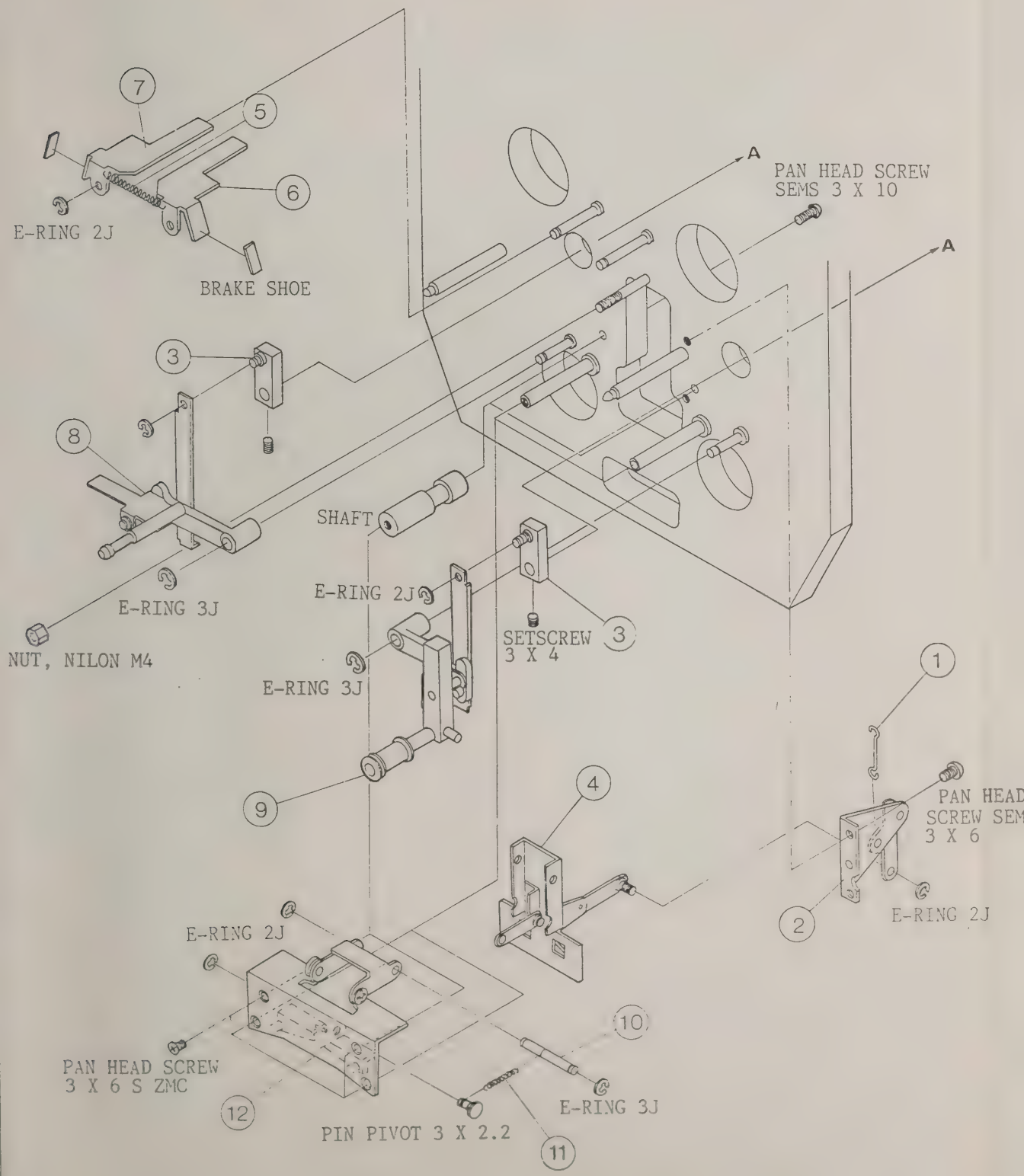
2-2-7 Tape Deck Ass'y-3 — Exploded View and Parts List —



Parts marked with an • require longer delivery time.

REF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
1	17966690-00	Damper Ass'y	1	*
2	16802124-00	Wire Holder	1	*
3	17010810-00	Capstan Motor Ass'y	1	
4	16082710-00	Belt 6 x 96	1	
5	17010920-00	Capstan Ass'y	1	
6	16152805-00	Base Ass'y	1	*
7	17061042-00	Reel Table Ass'y	1	
8	17040690-00	Pinch Roller (L) Ass'y	1	*
9	17040680-00	Pinch Roller (R) Ass'y	1	*

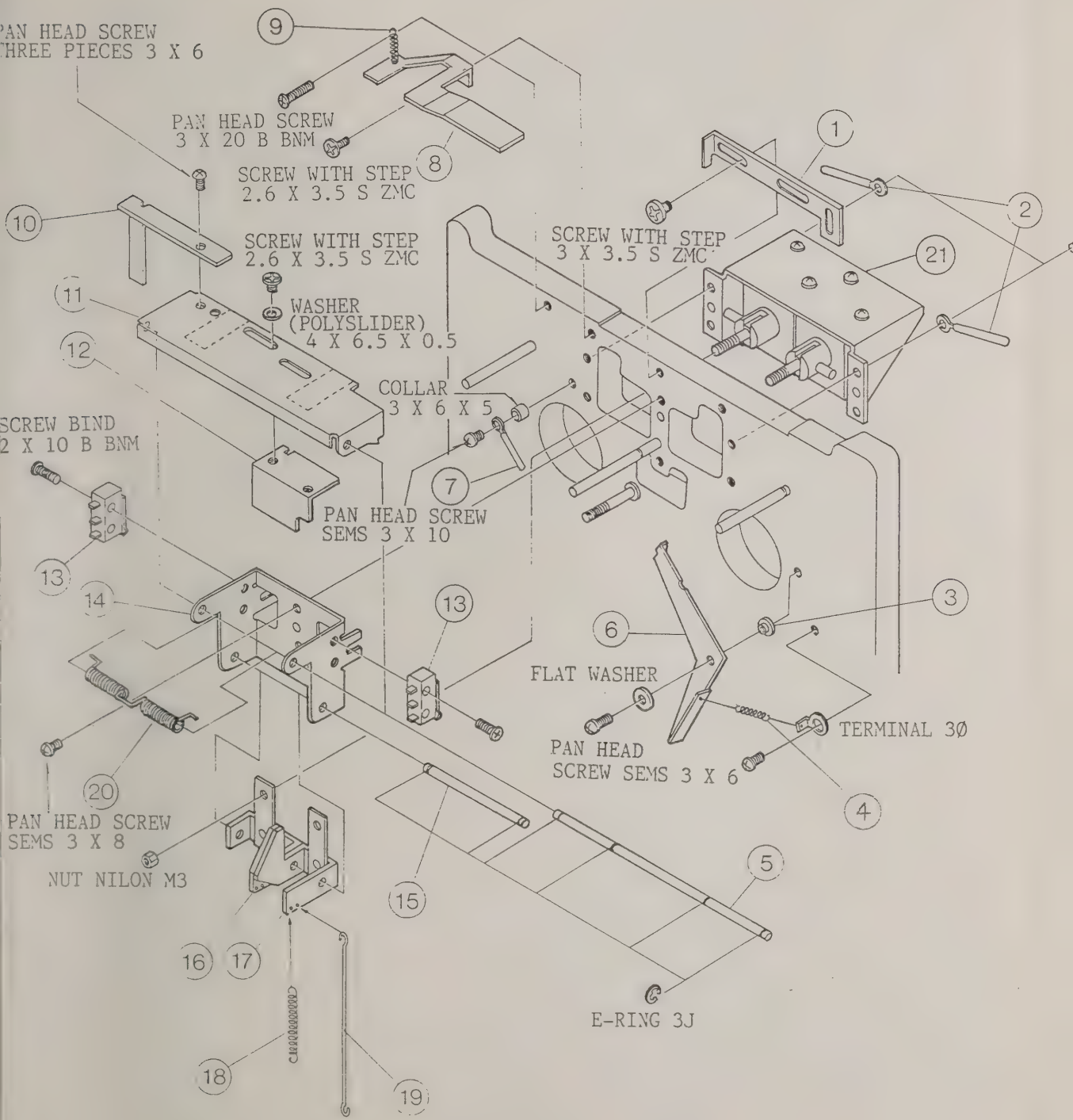
2-2-8 Tape Deck Ass'y-4 –Exploded View and Parts List–



Parts marked with an * require longer delivery time.

REF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
1	16767476-00	Rod 4 x 27	1	*
2	17966684-00	Hop-up Ass'y (3)	1	*
3	16792225-00	Arm	2	*
4	17966939-00	Hop-up Ass'y (2)	1	*
5	16381076-00	Spring, T2 x 0.04	1	*
6	16802091-00	Bracket, Brake (S)	1	*
7	16802092-00	Bracket, Brake (T)	1	*
8	17030840-00	Loader Arm (L) Ass'y	1	*
9	17030770-00	Loader Arm (R) Ass'y	1	*
10	16802076-00	Pin 3 x 23.2	1	*
11	16381072-00	Spring,T20.5 x 0.14	1	*
12	17966682-00	Hop-up Ass'y (I)	1	*
	16470310	Screw Pan Sems 3 x 10	1	
	16470306	Screw Pan Sems 3 x 6	1	
	16351130	E-Ring 2J	4	
	16351140	E-Ring 3J	1	
	16498260-01	Set-screw3 x 4 (1=70)	1	
	16420306	Screw Pan 3 x 6 S ZMC	1	
	16766466-00	Pin Pivot 3 x 2.2	1	
	16492081	Nut, Nilon M4	1	
	16756755-00	Shaft	1	
	16786789-00	Brake Shoe	1	

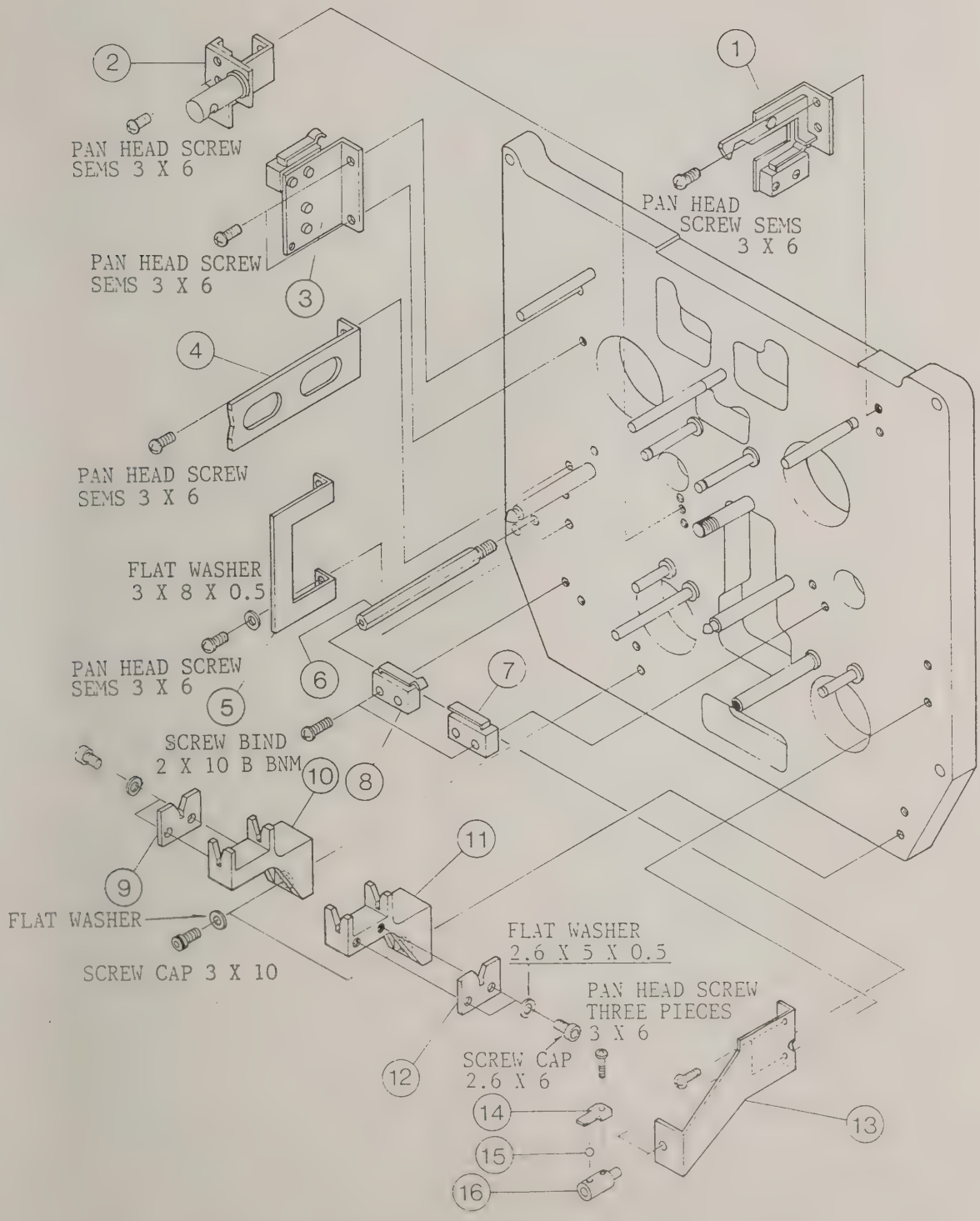
2-2-9 Tape Deck Ass'y-5 —Exploded View and Parts List—



Parts marked with an * require longer delivery time.

REF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
1	16802072-00	Bracket Slide	1	*
2	55810380-00	Harness Clip (A)	2	
3	16730327-00	Collar 8 x 2.3	1	*
4	16381079-00	Spring T6 x 0.1	1	*
5	16802077-00	Rod	1	*
6	16802074-00	Bracket, Arm	1	*
7	55810380-00	Harness Clip (A)	1	
8	16802119-00	Lever (A)	1	*
9	16381081-00	Spring (T)	1	*
10	16802093-00	Bracket, Arm	1	*
11	16802068-00	Bracket, Lock	1	*
12	16802073-00	Bracket, Slide	1	*
13	13221086	Microswitch	2	
14	16756742-00	Bracket B	1	*
15	16802089-00	Pin, Pivot 4 x 51.7	1	*
16	16792220-00	Link P-R	1	*
17	16792219-00	Link P-L	1	*
18	16381073-00	Spring T43 x 0.27	1	*
19	16766477-00	Rod 1 x 81.5	1	*
20	16389007-00	Spring Coil	1	*
21	17966685-00	Solenoid Ass'y	1	*
	16470308	Pan Head Screw Sems 3 x 8	2	
	16470306	Pan Head Screw Sems 3 x 6	2	
	16351140	E-Ring 3J	6	
	16496002	Flat Washer	1	
	16492072	Nut, Nilon M3	1	
	16498579	Pan Head Screw Three Pieces 3 x 6	1	
	16359133	Collar 3 x 6 x 5	1	
	16498619	Screw with Step 3 x 3.5 S ZMC	1	
	16498620	Screw with Step 2.6 x 3.5 S ZMC	2	
	13180009	Terminal 3ϕ	1	
	16496277	Washer (Polyslider) 4 x 6.5 x 0.5	1	
	16421320	Pan Head Screw 3 x 20 B BNM	1	
	16411210	Screw Bind 2 x 10 B BNM	1	
		Pan Head Screw Sems 3 x 10	1	

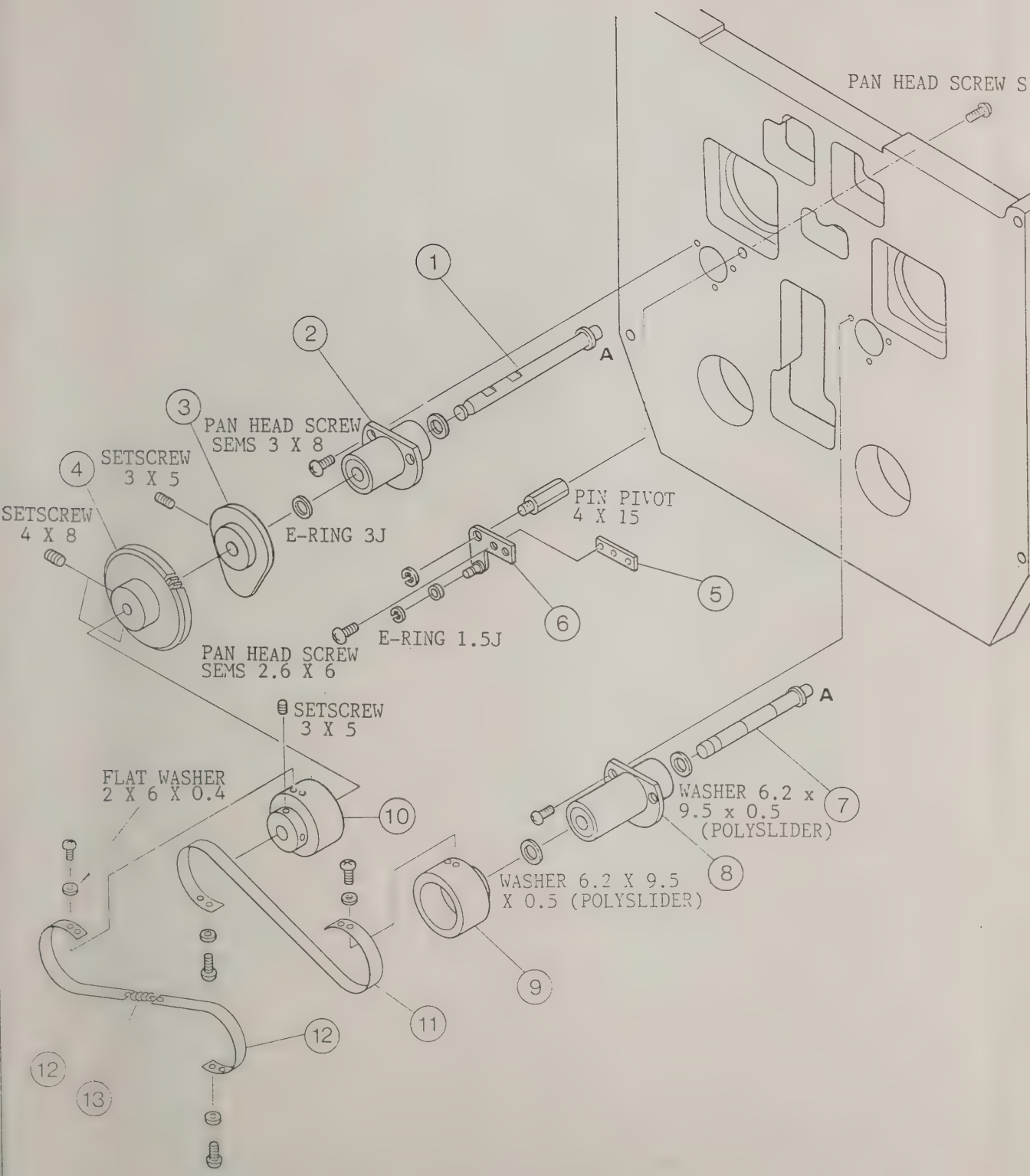
2-2-10 Tape Deck Ass'y-6 —Exploded View and Parts List—



Parts marked with an * require longer delivery time.

REF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
1	17080800-00	REC Switch Ass'y	1	*
2	17966686-00	Lamp Ass'y	1	*
3	17080960-00	System Switch ass'y	1	*
4	16756714-00	Bracket, Open	1	*
5	16802069-00	Bracket, Guide	1	*
6	16730332-00	Pole (E)	1	*
7	13221053	Microswitch	1	
8	13221075	Microswitch	1	
9	16802071-00	Bracket, Guide	1	*
10	16756741-00	Holder Guide (L)	1	*
11	16756740-00	Holder Guide (R)	1	*
12	16802071-00	Bracket, Guide	1	*
13	16802086-00	Bracket, Arm	1	*
14	16391880-00	Spring Plate	1	*
15	16322051	Steel Ball 5/32	1	
16	16730334-00	Holder	1	*
	16470306	Pan Head Screw Sems 3 x 6	6	
	16411210	Screw Bind 2 x 10 B BNM	1	
	16496002	Flat Washer 3 x 8 x 0.5	1	
	16498287-04	Screw Cap 3 x 10	1	
	16496096	Flat Washer	1	
	16498513-02	Screw Cap 2.6 x 6	1	
	16498572	Pan Head Screw Three Pieces 3 x 6	1	
	16496093	Flat Washer 2.6 x 5 x 0.5	1	

2-2-11 Tape Deck Ass'y-7 —Exploded View and Parts List—

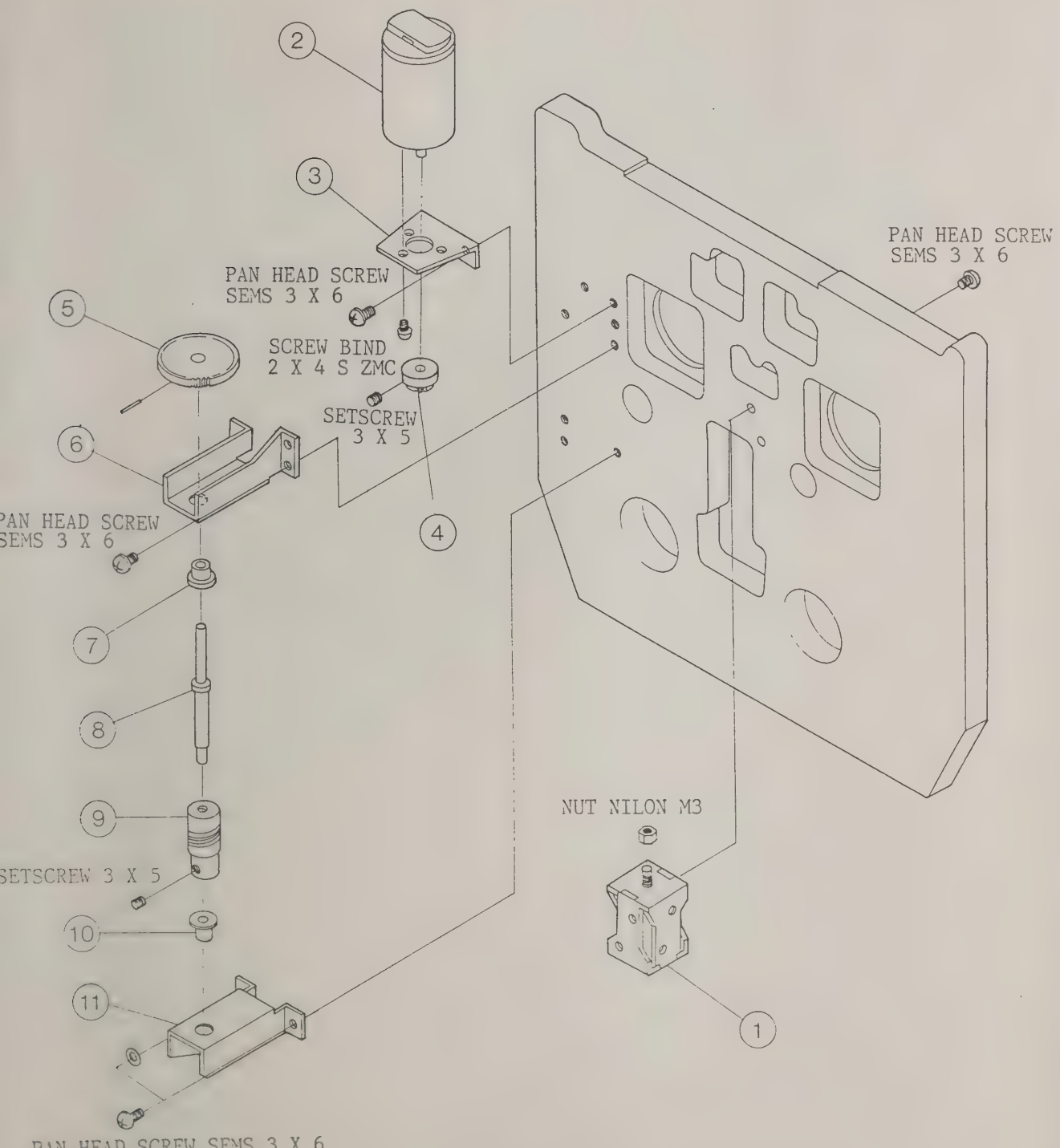


MS 3 X 8

Parts marked with an * require longer delivery time.

REF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
1	16766474-00	Shaft (R)	1	*
2	16792223-00	Holder R Ass'y	1	*
3	16786767-00	Cam	1	*
4	16362381-00	Gear, worm wheel	1	*
5	16802070-00	Bracket, Sub	1	*
6	16792226-00	Arm, Cam	1	*
7	16766475-00	Shaft L	1	*
8	16792224-00	Holder L Ass'y	1	*
9	16756722-00	Pulley, B	1	*
10	16756721-00	Pulley, A	1	*
11	16766479-00	Belt, Stainless A	1	*
12	16766480-00	Belt, Stainless B	2	
13	16381075-00	Spring, T 1.5x0.07	1	
	16470308	Pan Head Screw Sems 3 x 8	2	
	16496351	Washer 6.2 x 9.5 x 0.5 (Polyslider)	4	
	16498260-02	Setscrew 3 x 5	2	
	16498140-03	Setscrew 4 x 8	2	
	16351140	E-Ring 3J	1	
	16351120	E-Ring 1.5J	1	
	16766460-00	Pin Pivot 4 x 15	1	
	16005253-00	Bearing L-520 ZZW52	1	
	16470006	Pan Head Screw Sems 2.6x6	1	
	16411204	Screw Bind	2	
	16496000	Flat Washer 2 x 6 x 0.4	2	

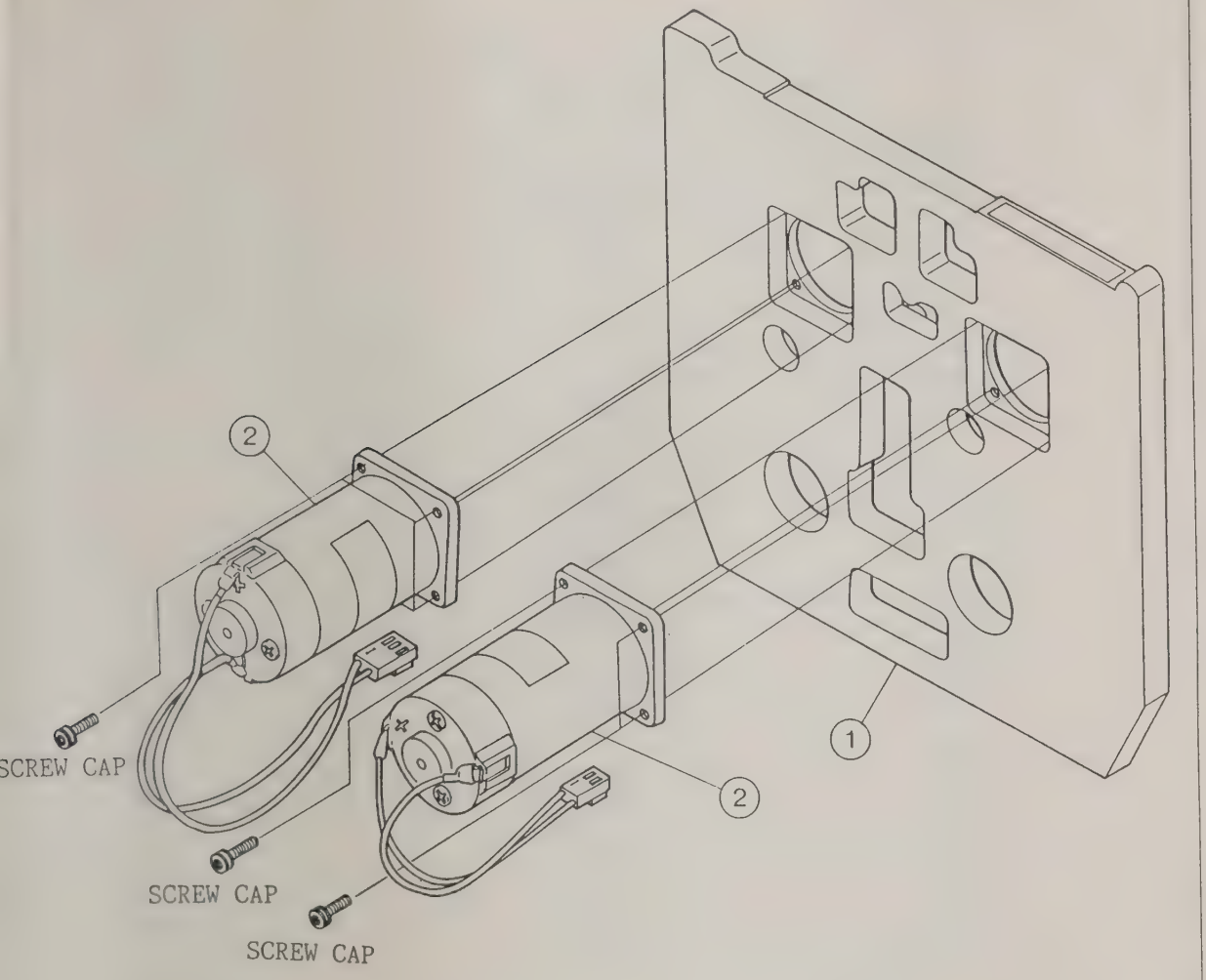
2-2-12 Tape Deck Ass'y-8 —Exploded View and Parts List—



Parts marked with an * require longer delivery time.

REF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
1	14770710-00	Solenoid, Latching	1	
2	14733560-00	Motor, DC	1	
3	16802079-00	Bracket, Motor	1	*
4	16362279-00	Gear, Supper A	1	
5	16362280-00	Gear, Supper B	1	
6	16802103-00	Bracket, Gear	1	*
7	16362286	Rulon Bearing ARF0406LD	1	
8	16766626-00	Shaft, Gear	1	*
9	16322378	Gear, Worm M0.8 x 14	1	*
10	16362286	Rulon Bearing ARF0406LD	1	
11	16802587-00	Bracket, Gear (B)	1	*
	16470306	Pan Head Screw Sems 3 x 6	4	
	16410204	Screw Bind 2 x 4 S ZMC	1	
	16498260-02	Setscrew 3 x 5	2	
	16496002	Flat Washer	1	
	16492072	Nut Nilon M3	1	

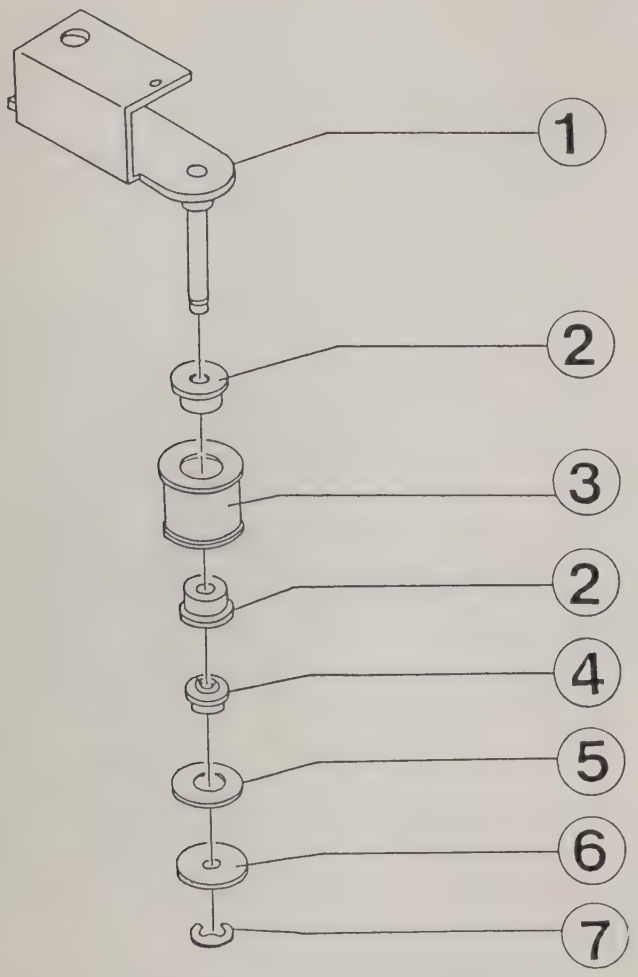
2-2-13 Tape Deck Ass'y-9 —Exploded View and Parts List—



Parts marked with an * require longer delivery time.

REF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
1	16152509-00	Base Ass'y	1	*
2	14733670-00	Motor DC	2	

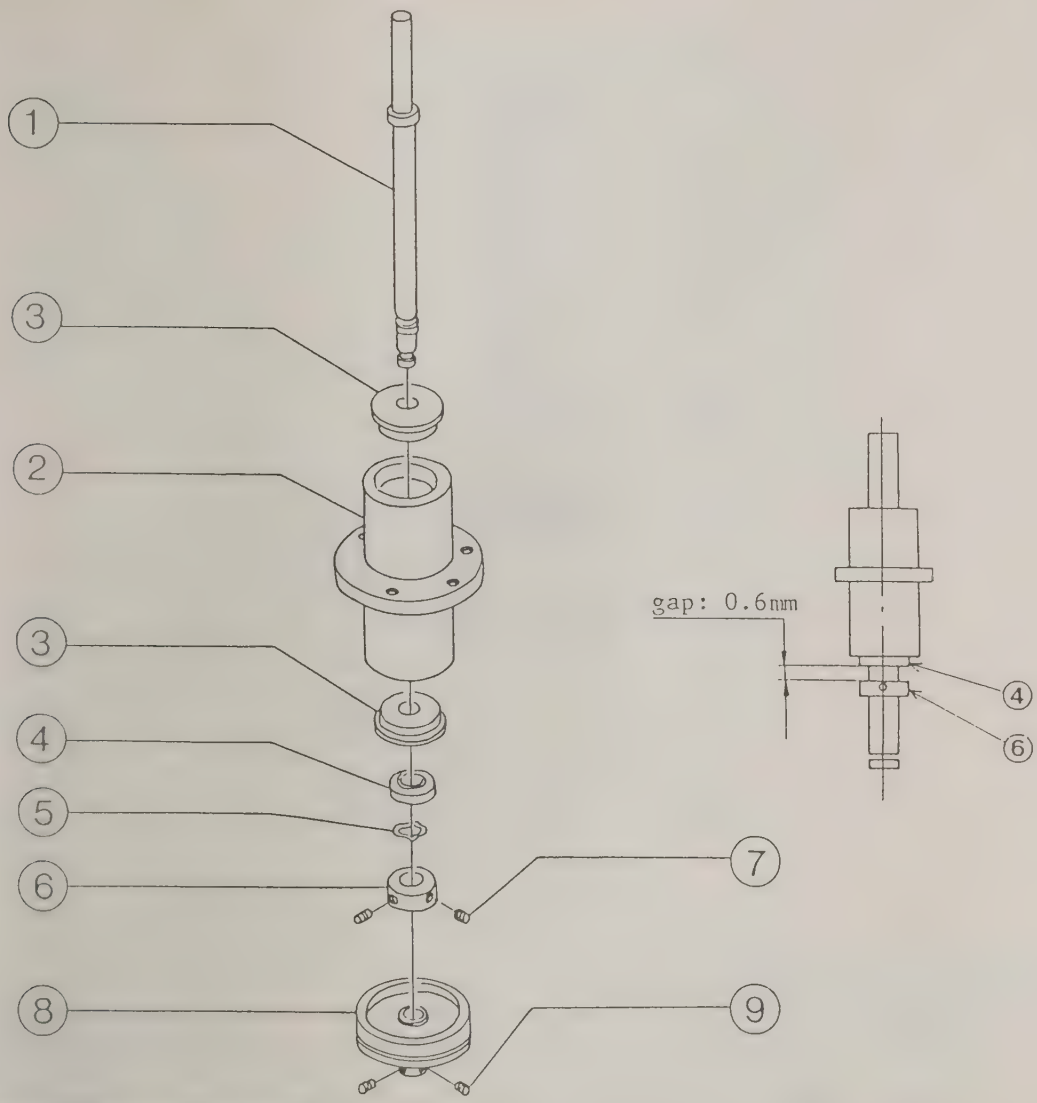
2-2-14 Tension Pulley Ass'y (17000520-00) —Exploded View and Parts List—



Parts marked with an * require longer delivery time.

REF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
1	16792213-00	Tension bracket	1	*
2	16008023-00	Bearing LF-730ZZ	2	
3	16766328-00	Tension Pulley	1	*
4	16359106-00	Collar	1	*
5	16390020-00	Wave washer	1	*
6	16359105-00	Collar	1	*
7	16351130	E-Ring 2J	1	*

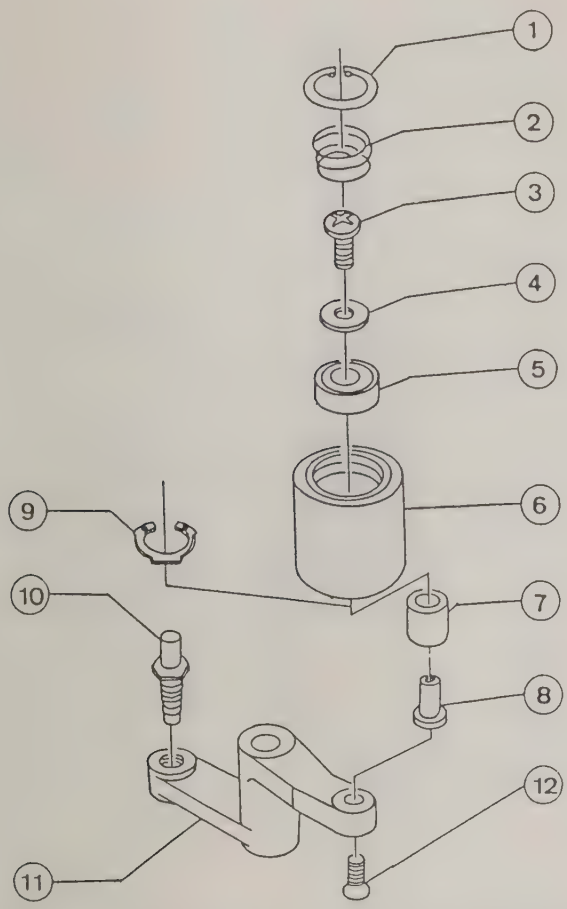
2-2-15 Capstan Ass'y (17010800-00) — Exploded View and Parts List —



Parts marked with an * require longer delivery time.

REF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
1	16766472-00	Capstan shaft (R)	1	*
2	16756739-00	Capstan holder (R)	1	*
3	16030630-00	Bearing RF-2280ZZ	2	
4	16756753-00	Bearing holder	1	*
5	16496444	Wave washer-8	1	*
6	16756744-00	Collar	1	*
7	16498260-02	Set screw 3x5	2	
8	16756720-01	Capstan pulley	1	*
9	16498260-02	Set screw 3x5	2	

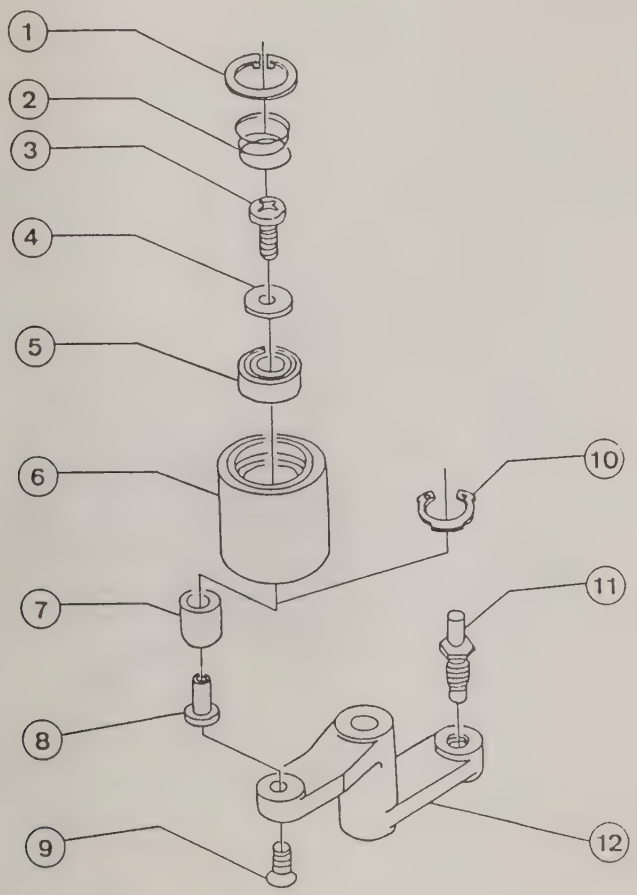
2-2-16 Pinch Roller Ass'y (L) (17040680-00) — Exploded View and Parts List —



Parts marked with an * require longer delivery time.

REF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
1	16352170	E-ring 12	1	
2	16385093-00	Spring 3x0.5	1	
3	16470308	Pan head screw 3x8 SEMS	1	
4	16496002	Flat washer 3x8x0.5	1	
5	16005243-00	Bearing L-1150ZZ Y04	1	
6	16792243-00	Pinch roller	1	
7	16730352-00	Collar	1	
8	16766496-00	Pivot pin	1	
9	16352430	R-ring-11	1	
10	16766468-00	Pivot pin 3x5	1	
11	16756757-00	Pinch roller arm (L)	1	*
12	16420306	Flush head screw 3x6 S ZMC	1	

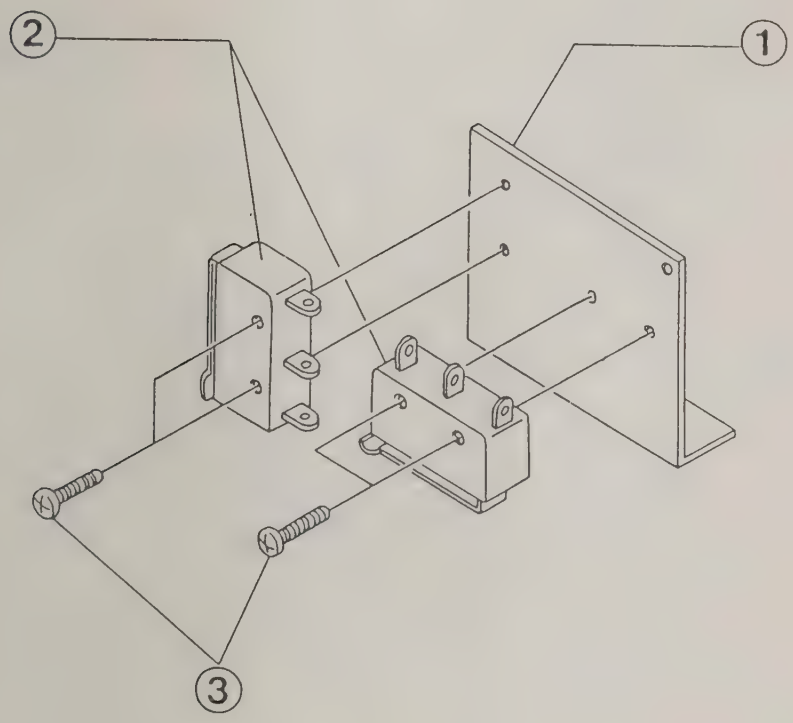
2-2-17 Pinch Roller Ass'y (R) (17040690-00) — Exploded View and Parts List —



Parts marked with an * require longer delivery time.

REF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
1	16352170	E-ring-12	1	
2	16385093-00	Spring 1x0.5	1	
3	16470308	Pan head screw SEMS 3x8	1	
4	16496002	Flat washer 3x8x0.5	1	
5	16005243-00	Bearing L-1150ZZ Y04	1	
6	16792243	Pinch roller	1	
7	16730352-00	Collar	1	
8	16766496-00	Pivot pin	1	
9	16420306	Flush head screw S ZMC 3x6	1	
10	16352430	R-ring-11	1	
11	16766468-00	Pivot pin 3x5	1	
12	16756756-00	Pinch roller arm (R)	1	*

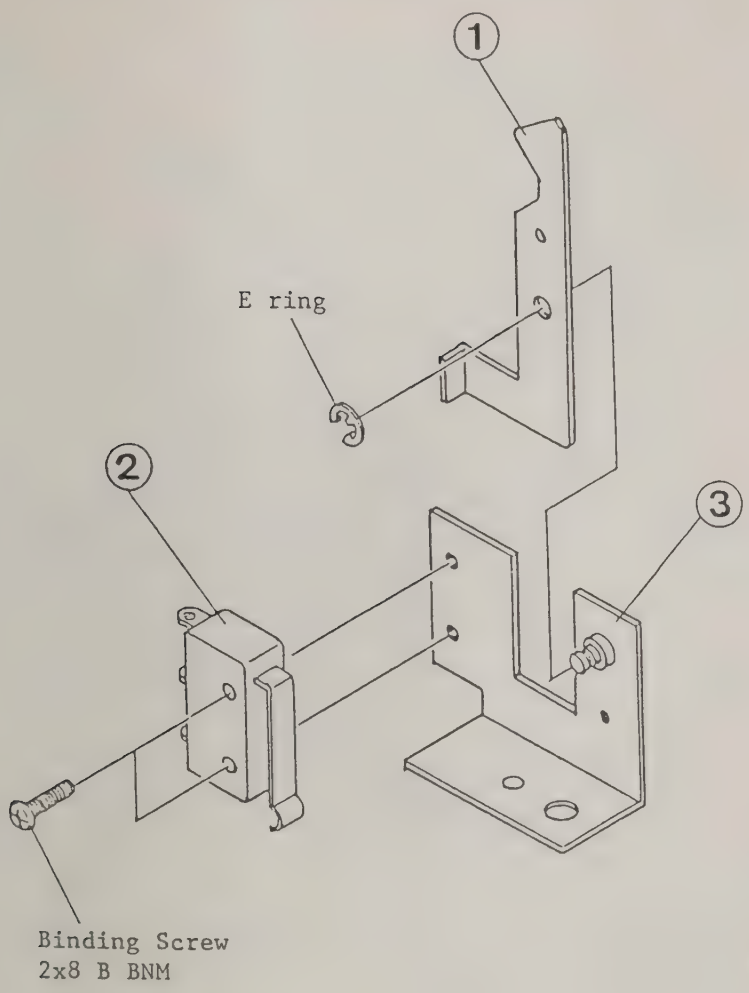
2-2-18 System SW Ass'y (17080810-00) – Exploded View and Parts List –



Parts marked with an * require longer-delivery time.

REF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
1	16802080-00	Switch bracket	1	*
2	13221075	M-switch	1	
3	16411208	Binding screw 2x8 B BNM	1	

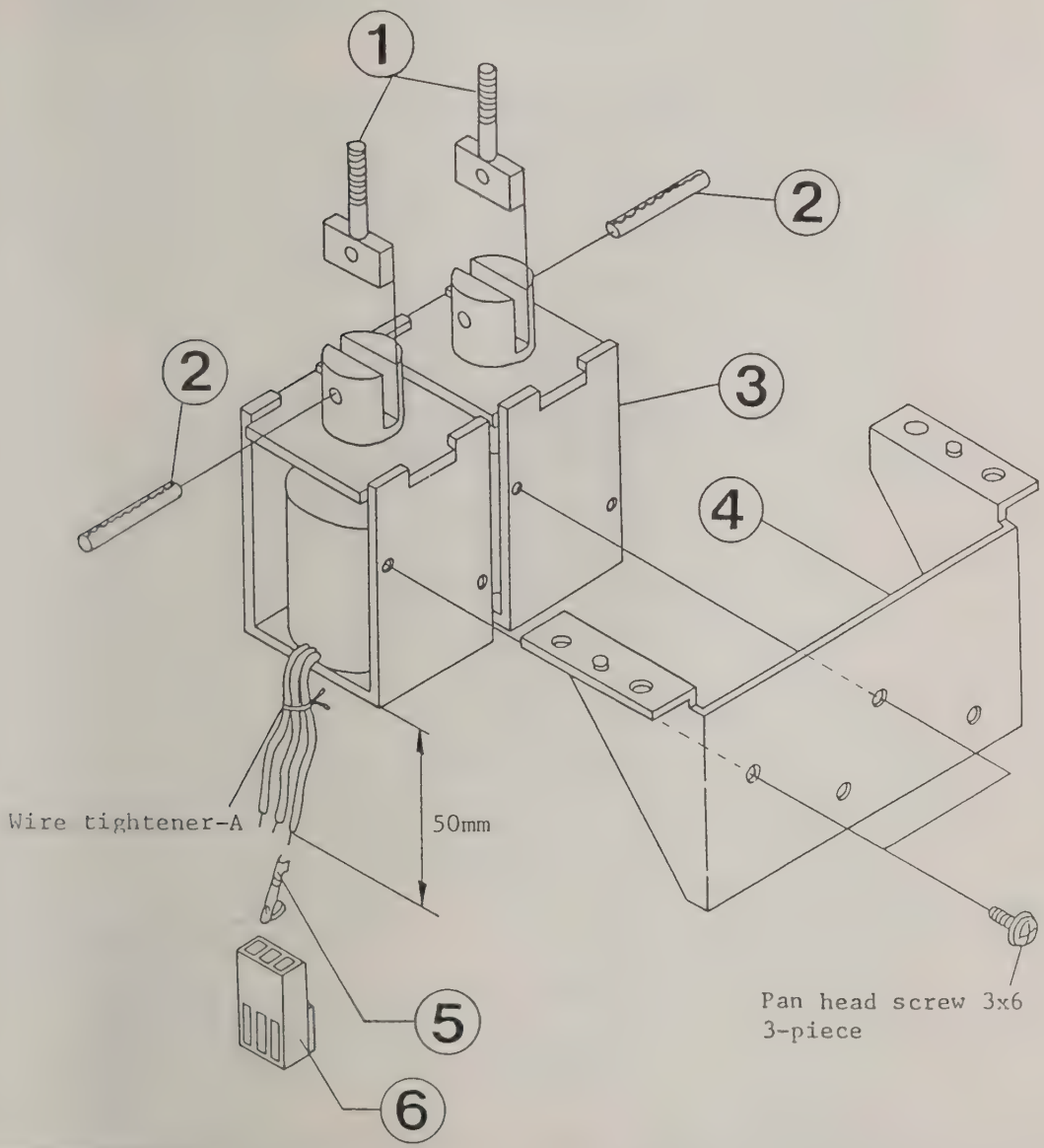
2-2-19 Rec SW Ass'y (17080800-00) — Exploded View and Parts List —



Parts marked with an * require longer delivery time.

REF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
1	16802075-00	Bracket, Arm	1	*
2	13221075	Micro-Switch	1	
3	16802426-00	Bracket, Switch	1	*

2-2-20 Solenoid Ass'y (17966685-00) — Exploded View and Parts List —



Parts marked with an * require longer delivery time.

REF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
1	16730329-00	Adjust bolt	2	*
2	16353350	Spring pin·3x20	2	*
3	14770720-00	Solenoid Latching	2	
4	16756743-00	Solenoid bracket	1	*
5	13199203	Contactor	6	
6	13150381	Housing 5051-3	2	

SECTION 3
CHECK AND ADJUSTMENT

3-1 MECHANISM ADJUSTMENT ITEMS

The Mechanical adjustment procedure is as follows:
For details, refer to the individual items.

3-3 Brake torque adjustment

3-4 Hop up adjustment

3-5 Loader arm adjustment

3-6 Contact pressure adjustment

3-7 Reel torque adjustment

3-8 Running adjustment

3-9 Servo gain adjustment

3-10 Tape servo adjustment

3-11 Wow flutter check

3-12 Tape speed check

3-13 Start stop time check

3-14 Fast forward time check

3-15 Air damper adjustment

3-16 Skew check

3-17 Track position adjustment

3-18 End sensor check

3-19 Tape servo adjustment

3-20 Mechanical aging

3-21 Accidental erasure protector adjustment

3-2 LIST OF JIGS

- Tension gauge (0 to 2kg) P/N 16960063
  Tension gauge (0 to 500g)
- Tension gauge (0 to 100g) P/N 16960062
- Video cassette tape P/N 14802131
- Magna see
- Empty reel
- Magnifying glass
- Osilloscope (Two Channel)
- Frequency counter
- Wow flutter meter
- Stop watch
- Oscillator

3-3 BRAKE TORQUE ADJUSTMENT

A) Instruments

- Empty reel
- Tension gauge (0 to 500g)

B) Adjustment Procedure

1. Adjust the latching solenoid mounting position and nylon nut M3 so that the mechanism will be as shown below when the latching solenoid is manually moved in the arrow directions.

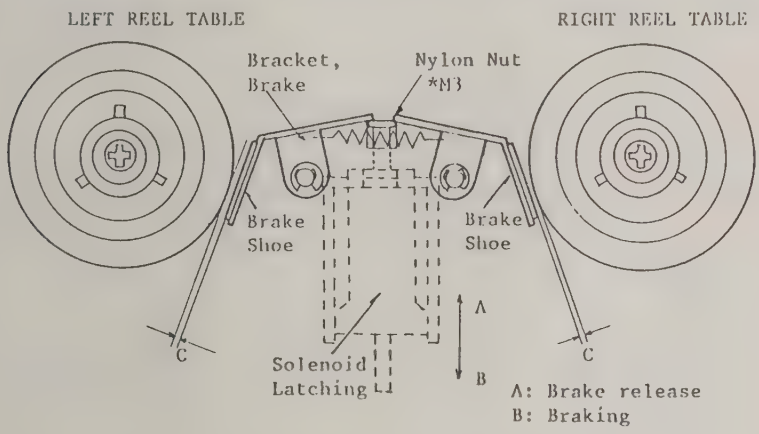


Fig. 3-1

Adjust the nylon nut M3 so that the clearance C will be anywhere from 0.5 to 2.5mm when the latching solenoid is moved in direction A. Check that, when the letching solenoid is moved in direction B, the brake shoes are pressed to the reel table assemblies and that the brake bracket and nylon nut M3 (mark *) part from each other.

2. Place empty reels on the reel table assemblies, and read the torque when the reel table assemblies run in the arrow direction at constant speed.

3. If the torque does not meet the requirement, readjust the clearance C (0.5 to 2.5mm) mentioned in item 2 above.

   - The brake torque is too strong ..... Adjust the clearance C toward 2.5mm
   - The brake torque is too weak ..... Adjust it toward 0.5mm.

NOTE: If it is still difficult to make the torque meet the requirement, readjust it by bending the brake bracket.

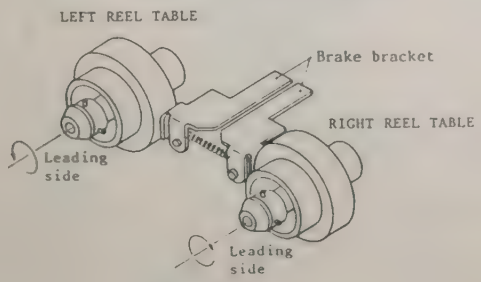


Fig. 3-2

C) Specification

		Brake torque	Read tension gauge when empty reel (13mm in radius) is used
Right reel table	Working side	200 to 300g-cm	154 to 230g
	Releasing side		
Left reel table	Working side	200 to 300g-cm	154 to 230g
	Releasing side		

3-4 HOP UP ADJUSTMENT

A) Instrument

- Tension gauge (0 to 500g)

B) Adjustment Procedure

1. Loosen the set-screw shown in the illustration below before starting adjustment.

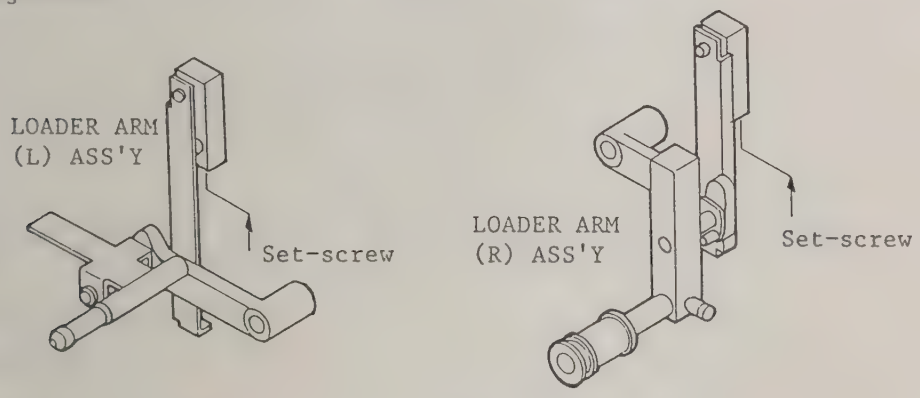


Fig. 3-3

2. Remove stainless steel belts A and B.
3. Turn spur gear B by hand untill the bearing on the cam arm reaches cam point A.

   NOTE: Point A is where the distance between point B and C begins to increase to enter the area of stability.

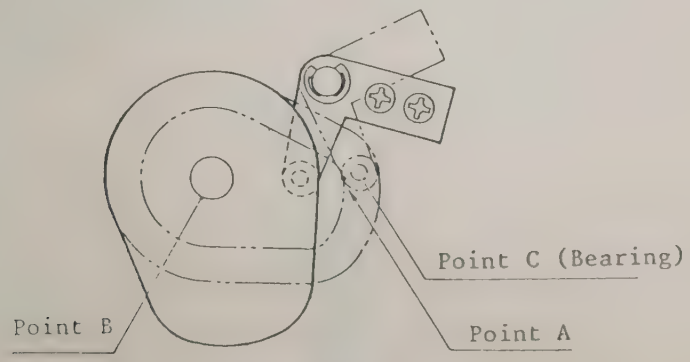


Fig. 3-4

Continued in next page...

4. Adjust the position of the sub-bracket to that, when the cam arm bearing is set as mentioned in Step 3, Hop up assembly (2) is pushed to Hop up assembly (1).

5. Check that the force of pushing Hop up assembly (2) to Hop up assembly (1) is 300g or more. (Push the pinch roller arm from with the tension gauge.)

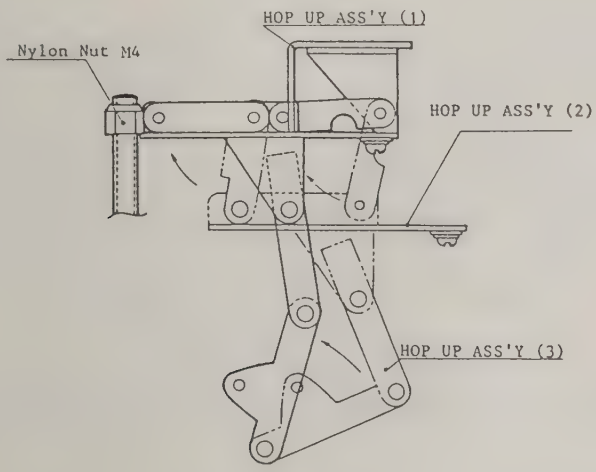


Fig. 3-5

NOTE: If Hop up assembly (2) does not properly rise, make a fine adjustment using nylon nut M4 shown above.

3-5 LOADER ARM ADJUSTMENT

A) Instrument

- Tension gauge (0 to 500g)

B) Adjustment Procedure

1. Remove stainless steel belts A and B (See Fig. 3-8) before starting adjustment.
2. Turn spur gear B by hand until the Loader arm (R) ass'y is in the loading condition.

NOTE: Set the Loader arm (R) ass'y to the point shown below when the cam is set to point A in Fig. 3-4 of the Hop up adjustment procedure.

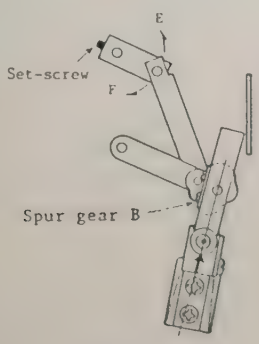


Fig. 3-6

Continued in next page...

3. Adjust the arm angle so that the pushing force of the Loader arm (R) ass'y is 300g or more. (Adjust the position of the arm secured on the shaft with the set-screw.)

   NOTE: The pushing force decrease if the arm is moved in direction E, or increase if the arm is moved in direction F. (See Fig. 3-6)

4. Set the Loader arm (L) and (R) ass'y as shown below.

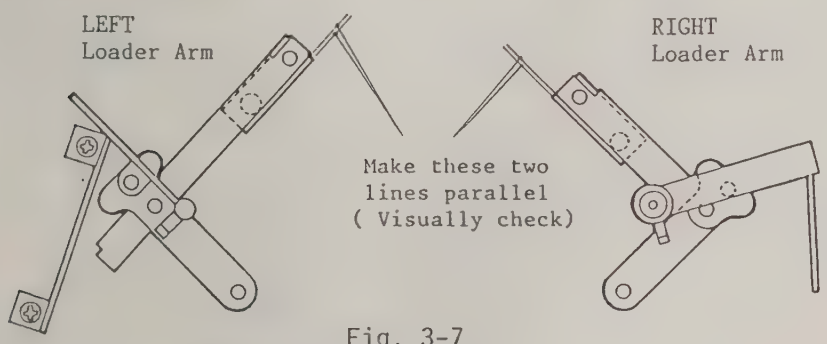


Fig. 3-7

5. Place stainless steel belts A and B on pulleys A and B, with the pulleys in the position shown below after setting the Loader arm ass'y as mentioned in Step 4 above.

   NOTE: See that the spring on stainless steel belt B is as close (near) to pulley A as possible (about 5mm), B with the set-screw.

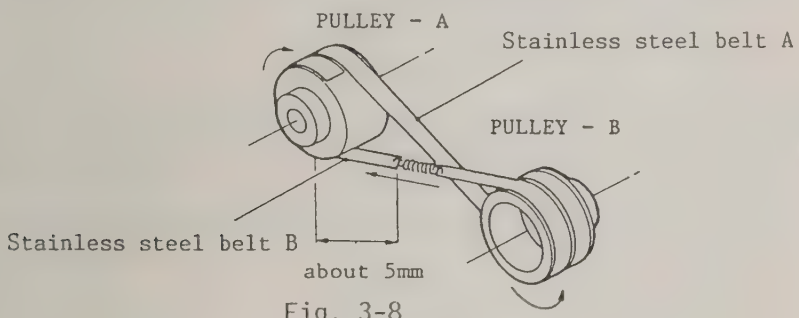


Fig. 3-8

6. Turn spur gear B by hand untill the Loader arm (L) ass'y is in the loading position.

   NOTE: Make a fine adjustment of the arm angle with the set-screw so that the pushing force of the Loader arm (L) ass'y is 300g or more.

   The pushing force decreases if the arm is moved in direction E, or increases if it is moved in direction F.

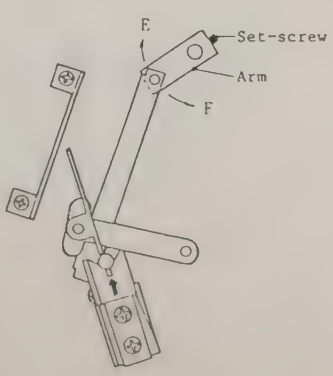


Fig. 3-9

3-6 CONTACT PRESSURE ADJUSTMENT

A) Instruments

- Tension gauge (2kg)
- Dummy half
- Screws (approx. 3 x 8mm)

B) Adjustment Procedure

1. Change the screws (A) for the pinch roller (R) ass'y as shown below (Also, Pinch roller (L) same manner).

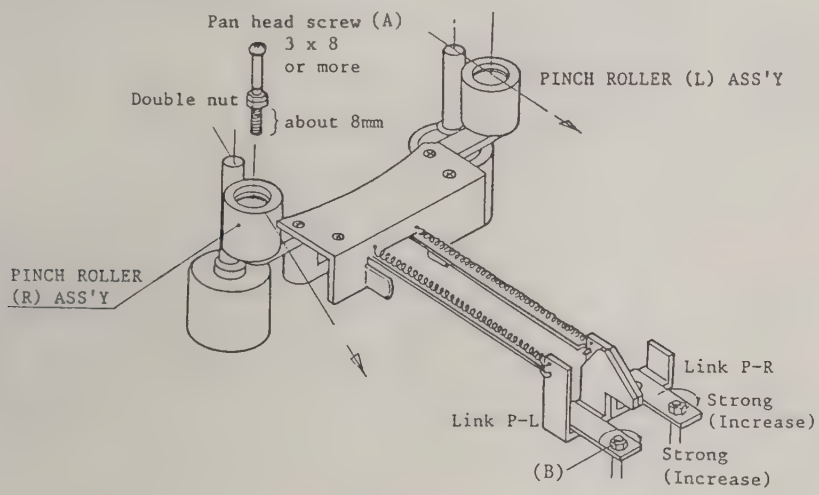


Fig. 3-10

2. Connect the tension gauge to the screw shown in the illustration above, pull it in the arrow direction, and adjust the slip limit point to meet the specifications.
3. Adjust the contact pressure with the nylon nuts (B) for link P-L and P-R.

C) Specifications

	Contact pressure
Pinch roller (R)	1.5 (+0.2, 0) kg
Pinch roller (L)	1.5 (+0.2, 0) kg

-7 REEL TORQUE ADJUSTMENT

A) Instruments

- Empty reel (Reference: r = 13mm)
- Tension gauge (0 to 200g)

B) Measuring Method

1. Running at lowest speed mode:
   - Make adjustment by R15 to make the supply tension of right-side reel stand 150 ±20g.
   - Make adjustment by R6 to make the take-up of left-side reel stand 200 ±20g.

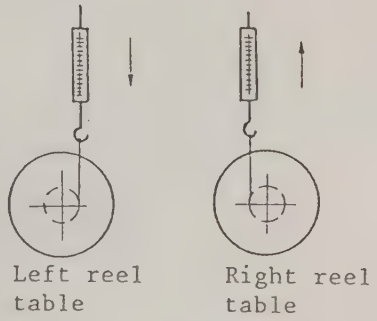


Fig. 3-11

2. Running at Fast riwind mode:
   - Make adjustment R8 to make the supply tension of left-side reel stand 120 ±20g.
   - Make adjustment R13 to make the take-up of right-side reel stand 200 ±20g.

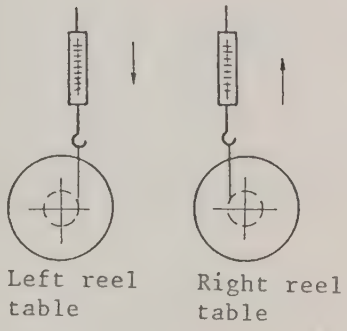


Fig. 3-12

C) Adjustment location (on SERVO AMP A ASS'Y)

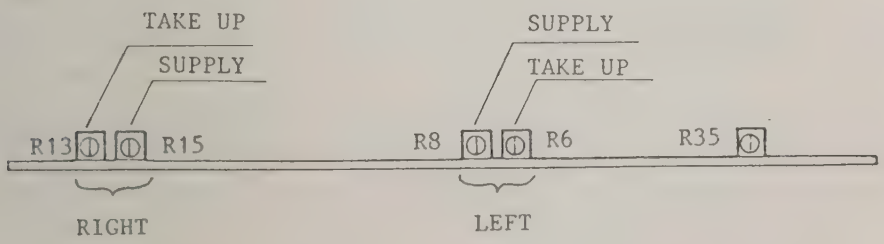


Fig. 3-13

3-8 RUNNING ADJUSTMENT

A) Instruments

- Oscilloscope
- Video cassette tape T-120

B) Check Method

1. Visually check how the tape runs.
2. If the tape curls, make a fine adjustment of the bracket for holder guide R and /or holder guide L in the arrow direction.

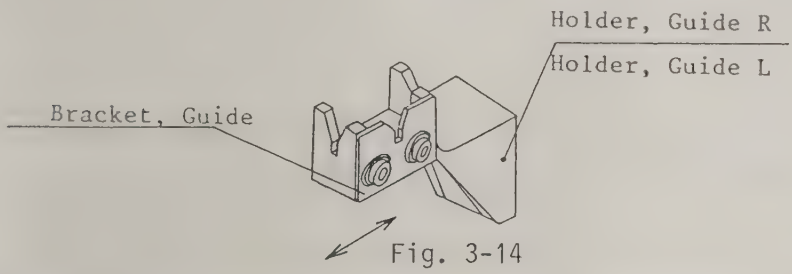


Fig. 3-14

3. Check the beginning the tape (BOT) and end of the tape (EOT) run at the minimum and maximum speeds.
4. Connect the synchroscope to TP5 on the FM REC/REP AMP.
5. Observe the waveforms of edge track (CH1 to CH21) at the beginning and end of the tape and make sure that there is no periodical level variation (level down to 80% or less).

3-9 SERVO GAIN ADJUSTMENT

A) Instruments

- Oscilloscope
- Wow flutter meter
- Video cassette tape T-120

B) Connecting and adjusting method (Moire servo adjustment)

1. Fully turn R34, R49 of SERVO AMP (A) ASS'Y anticlockwise (state of gain max.).
2. Set the tape speed to the lowest level, and observe the waveform on CONTROL AMP ASS'Y TP6. (GND side: TP2.)
3. Turn R35 of Step 1 clockwise until the oscillation of TP6 waveform stops.
4. Set to the maximum speed, and adjust R49 in same manner to that of the above 2 and 3.
5. By switching to each speed, confirm that all-speed oscillation stops.
6. When there is a speed showing the oscillation, turn R35 and R49 until the oscillation stops.

3-10 TAPE SERVO ADJUSTMENT

1. Set the turning around the center of R50, R51 of SERVO AMP ASS'Y (state of gain max.).
2. Set the tape speed to the lowest, and make recording for a constant time by setting the tape-servo selector switch to ON.
3. While playing back the tape recorded by the above 2, observe the waveform on CONTROL AMP ASS'Y TP6 (GND side: TP2).
4. Adjust R50 in the above 1 until the oscillation of TP6 waveform stops.
5. Set the tape speed to the maximum, and make recording for a constant time same to the above 2.
6. Same as above 3 and 4, adjust R51.
7. Selector to each speeds, confirm that all-speed oscillation stops.
8. When there is a speed showing the oscillation, make readjustment of R50 and R51 until oscillation stops.

   NOTE: Make adjustment of B.C at the near position to the end of tape.

3-11 WOW FLUTTER CHECK

A) Instruments

- Wow flutter meter 8300-W
- Video cassette T-120
- (Oscilloscope)

B) Measuring Method

Connect the wow flutter meter to TP5 on the FM REC/REP AMP ASS'Y, and measure wow flutter in a simultaneous record/reproduce state.

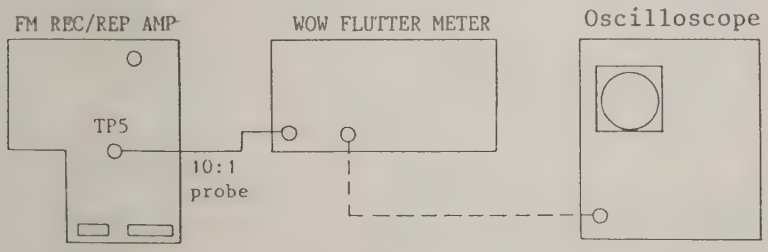


Fig. 3-15

- Tape speed : 1.2, 2.4, 4.8, 9.5, 19.5 and 38cm/sec
- Input : Short - circuit
- Tape : BOT and EOT condition
- Bandwidth : WIDE, INTER and IRIG

Continued in next page ...

C) Specifications

Tape Speed	Bandwidth (IRIG STD)
2.4cm/sec	0.7%p-p (156)
4.8cm/sec	0.55%p-p (313)
9.5cm/sec	0.45%p-p (625)
19.0cm/sec	0.35%p-p (1250)

- Tape speed variation width : 0.2%
- Tape speed deviation : ±0.2% or less

3-12 TAPE SPEED CHECK

A) Instruments

- Frequency counter
- 20kHz test tape

B) Measuring Method

1. Play back the test tape, and measure TP5 on the FM REC/REP AMP ASS'Y with frequency counter.

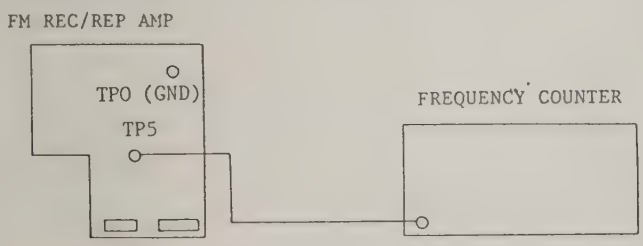


Fig. 3-16

- Measurement conditions are as follows:
  - Tape speed : 1.2, 2.4, 4.8, 9.5, 19.0 and 38cm/sec
  - Tape position : BOT and EOT

C) Specifications

Speed	Deviation	Variation Width
2.4cm/s	623.75 to 626.25Hz	1.25Hz
4.8cm/s	1247.5 to 1252.5Hz	2.5Hz
9.5cm/sec	1495 to 2505Hz	5Hz
19cm/s	4990 to 5010Hz	10Hz

- Tape speed variation width : 0.2%
- Tape speed deviation : ±0.2% or less

3-13 START STOP TIME CHECK

A) Instruments

- Oscilloscope
- Video cassette tape T-120

B) Measuring Method

1. Record +1VDC on the tape at the highest speed.
2. Apply the reproduced output signal to axis Y of the oscilloscope. (at output terminal any channel).
3. Start time check:
   With a trigger pulse from the NO.3 on the REMOTE CONTROL terminal, measure the time until the output reaches +1V.
4. Stop time Check:
   With a trigger pulse from the NO.5 on the REMOTE CONTROL terminal, measure the time until the output reaches 0V.
5. Connecting method:

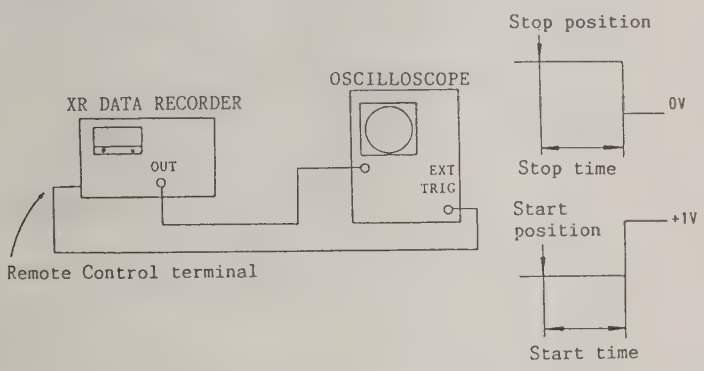


Fig. 3-17

C) Specification

	Specification
Start time	2 seconds or less
Stop time	2 seconds or less

14 FAST FORWARD TIME CHECK

A) Instruments

- Stop watch
- Video cassette tape T-120

B) Measuring Method

Measure the time from the moment of pressing the F.FWD or REWIND button till the moment of having wound the tape. But do not include the time in which the end sensor operates.

C) Specifications

- F. FWD mode ..... 5 minutes or less
- RWD mode ..... 5 minutes or less

D) Counter Accuracy check in F.FWD and RWD modes:

1. Set the tape to BOT.
2. Clear the counter (0000).
3. Run the tape FAST FORWARD until stops at the end.
4. REWIND the tape from position until it stops at the end.
5. Read the counter and check how much it differs from 0.

- Specification : ±20 or less

NOTE: If the specified value is not satisfied, check the pinch roller pressure, etc. again.

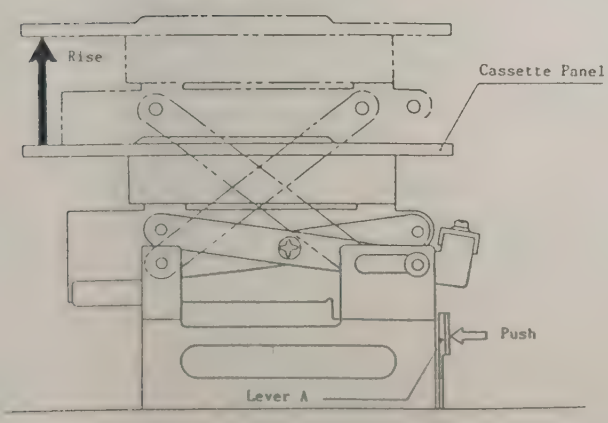
3-15 AIR DAMPER ADJUSTMENT

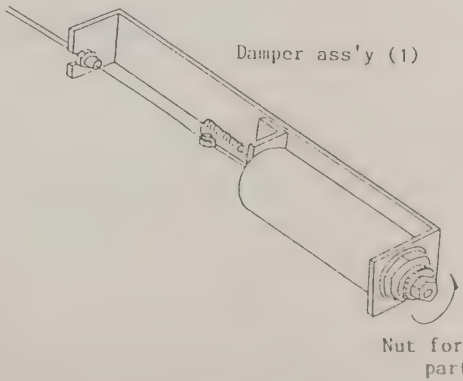
A) Instruments

- Video cassette tape T-120

B) Adjustment Method

1. Set the main unit as shown in the following Fig. 3-18 and make sure that the cassette panel rises as shown in the Figure. When the manual eject operation (press lever A) is performed. If the unit does not rise completly, turn counterclockwise (CCW) the part (A) of Air Damper Ass'y (1).





- Turn CCW : To decrease damper effect
- Turn CW : To increase damper effect

Fig. 3-18

Continued in next page ..

2. Make sure that this adjustment is made with the video cassette being set in the unit.
3. Check that the cassette panel opens in the arrow direction when it reaches the highest point.
4. The optimum point of damper is the position where the damper is most effectively used within the range in which the cassette panel most accurately rises to the maximum rising point.
5. Move the main unit 90° and ensure that it also operates in the same way. In this case, the operation of the above step 3 is performed spontaneously by the force of spring.

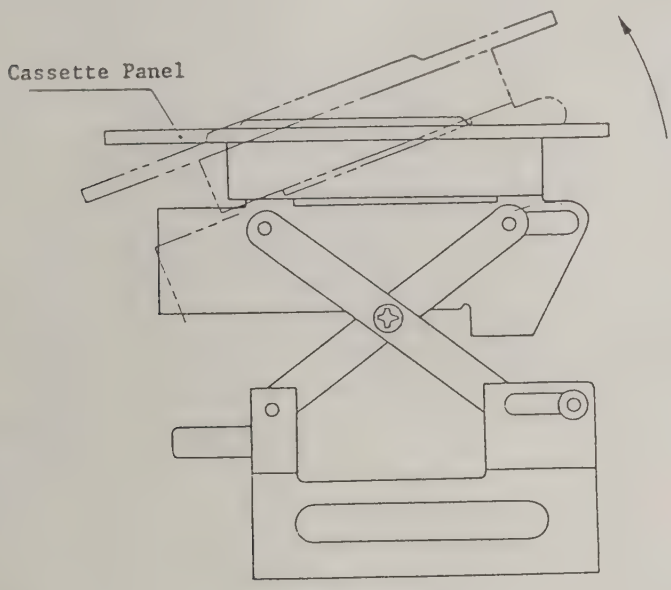


Fig. 3-19

3-16 SKEW CHECK

A) Instruments

- Oscillator
- Oscilloscope (Two Channel)
- Video cassette tape T-120

B) Measuring Method

Using channel 1 as the reference channel, read the extent of the out of phase of other channels with the oscilloscope (simultanously recording and reproducing).

Conditions :
- Tape speed .... Highest
- Input ..... 20Hz rectangular waveform
- Tape ..... Body of tape

Continued in next page ...

C) Specifications

1 CH	Specified	15 CH	51.5
2 CH	133 µsec	16 CH	158
3 CH	30.0 "	17 CH	55.0
4 CH	137 "	18 CH	162
5 CH	33.5 "	19 CH	58.5
6 CH	140 "	20 CH	165
7 CH	37.0 "	21 CH	62.0
8 CH	144 "		
9 CH	40.5 "		
10 CH	147 "		
11 CH	44.0 "		
12 CH	151 "		
13 CH	48.0 "		
14 CH	155 "		

NOTE: If the specifications are not satisfied, check the tape transport again for possible trouble. There shall be no abnormal difference inskew between BOT and EOT.

3-17 TRACK POSITION ADJUSTMENT

A) Instrument

- MAGNA-SEE (Soundcraft)
- Clear plastic adhesive tape
- Magnifying glass
- Video cassette tape T-120

B) Measuring Method

- Place an erased tape in the tape transport, and record mode at no input. Measure at points of BOT and EOT at the lowest and highest speeds.
- Stick adhesive tape from above lightly, and peel it off to keep data.
- Visually check that the track intervals are uniform and show no difference between BOT and EOT.

NOTE: Use the record head only for this measurement.

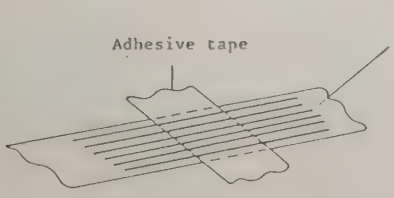


Fig. 3-20

18 END SENSOR CHECK

- Check Method

1. No loading operation shall take place if the cassette compartment ass'y is closed without a tape.
2. Load a tape, and run the tape by pressing the FWD button or F.F button until it comes to the end. Then press the FWD or F.F button again, and check that neither of these modes are of operation.
3. Load a tape, and run the tape by pressing the RWD button until it comes to the end. Then press the RWD button again, and check that the mode is of no operation.
4. If all the results obtained from Step 1, 2 and 3 are satisfactory, the end sensor is properly operating.

3-19 TAPE SERVO ADJUSTMENT (on SERVO AMP A)

- Make adjustment with VR (R49) in such a way that S/N ratio becomes the best value when simultaneously recording and reproducing.

3-20 MECHANICAL AGING

A) Instrument

- Loading Checker CD-3

B) Check Method

1. Connect the loading checker to an adjusted transport ass'y.
2. Manually set the transport ass'y to unloading condition (in which the tape is not puller out).
3. Switch the checker ON.
4. After switching power ON, shift the switch from STOP to START. Alternate loading and unloading at intervals of about 10 to 20 seconds after that.
5. Keep the transport ass'y operating continuously for these hours.
6. Check the various parts of it again.

NOTE: When the switch is shifted from START to STOP, operation stop in unloading condition.

3-21 ACCIDENTAL ERASURE PROTECTOR ADJUSTMENT

- After loading a tape, change the position of the REC switch ass'y and adjust the acctidental erasure protector, using a check JIG.

NOTE: 1. The REC switch must be OFF when a tape is loaded.
2. The REC switch must be ON when the check JIG is loaded. The REC switch must operate ON an OFF completly when the tape and check JIG are loaded.

SECTION 4
CHECK AND ADJUSTMENT SPECIFICATIONS

For check and adjustment specifications on tape transport section, mainly mechanical adjustment and specifications shall be described by actual mounting of tape transport ass'y, cassette control ass'y chassis, panel-operation ass'y, HEAD AMP ass'y, FM REC/REP AMP, BIAS & ERASE AMP, DC power unit (A),(B), harness ass'y and CONTROL AMP.

- Unless otherwise specifically noted, all the test are made under the following conditions:

  - Source voltage ..... 12V DC $\pm$0.2V (or 24V DC)
  - T.S. -DATA SW ..... DATA
  - Temperature ..... Room temperature
  - Using tape ..... HG T-120

4-1 EQUIPMENT REQUIRED FOR ELECTRICAL

A minimum of the following tools and test instruments are required for measuring and testing to obtain optimum performance. If any test instrument listed here is not available, acloss equivalent can be used.

- Oscilloscope ..... 30MHz or more
- DC voltmeter ..... 0.1V to 10V (4 figures)
- AC voltmeter ..... True rms meter
- Standard voltage Generator ..... 0.1V to 10V (Resolution 1mV or less)
- Oscillator ..... 10Hz to 100kHz (distortion 1% or less)
- Frequency counter ... 2MHz or more (5 figures or more)
- Distortion meter .... 200kHz or more
- Filter
- Current probe
- Test tape T-120
- Wow flutter meter etc.

TAPE TRANSPORT ASS'Y CHECK

4-2-1 Capstan Motor Ass'y

CHECK ITEM	SPECIFICATIONS	ADJUSTMENT CONDITIONS
Shaft runout	Less than 5μ	Check tape travel section with circumference of holder, capatan L reference
Spacer circumferential runout	less than 2mm	Reference with both centers of shaft & capstan L
Gap between motor bracket-A & loader ass'y	0.45mm	
Axial face runout of Loader ass'y	Less than 50μ	Check the portion 40 ø
Reference circle rotation runout on Encoder desk	within 10μ	
Gap between Encoder disk and moire detector	More than 1mm	Align at screwed point of PCBA
Gap between Encoder disk and Index Encoder	0.3mm	
Moire Output	100Vp-p or more	Check the TP-1 during tape run at 2.4cm/s
Moire Output	Aquare wave with 0 and 5V level	Check at TP-2
Thrust play	Less than 0.3mm	Encoder disk and Index encoder should never be contacted by excessive thrust play
Ageing	19cm/s equivalent, Foward/Reverse directions 24hrs at both modes	

4-2-2 Capstan Ass'y

CHECK ITEM	SPECIFICATIONS	ADJUSTMENT CONDITIONS
Shaft runout	Less than 3μ	Check at outer circumference reference of capstan holder R and also tape path

4-2-3 Tape Deck Ass'y

CHECK ITEM	SPECIFICATIONS	ADJUSTMENT CONDITIONS
Reeltable height	39 ±0.1mm	
Brake torque	Effective side both on L & R Ass'y: 200 to 300g-cm	
Reel torque (R side)	Take-up: 200 ±10g-cm Supply : 150 ±10g-cm	
Reel torque (L side)	Take-up: 200 ±10g-cm Supply : 200 ±10g-cm	
Squareness of Capstan motor Ass'y	90° ±1'	
Squareness of Capstan Ass'y	Same as above	
Squareness of Loader Arm (R)	Same as above	
Squareness of Loader Arm (L)	Same as above	
Gap between Brake shoe and Reel table	0.5 to 2.5mm	
Pressure force by Loader Arms (L,R)	300 to 400g	
Pressure force by Hop-up Ass'y	300 to 400g	
Pinch roller pressure	1.5kg +0.2, -0 both on L and R	
Flutter	Refer to "SPECIFICATIONS" section	
Tape speed Accuracy		
Start/Stop time		
Fast winding time		

CHECK ITEM	SPECIFICATIONS	ADJUSTMENT CONDITIONS
Static Skew At 19.0cm/s tape speed	CH 1 0 usec 2 ± 133 " 3 " 30 " 4 " 137 " 5 " 33.5 " 6 " 140 " 7 " 37 " 8 " 144 " 9 " 40.5 " 10 " 147 " 11 " 44 " 12 " 151 " 13 " 48 " 14 " 155 " 15 " 51.5 " 16 " 158 " 17 " 55 " 18 " 162 " 19 " 58.5 " 20 " 165 " 21 " 62.0 "	0 (LOW) 0 (HIGH) 266 66.5 60 15 273 68.5 67 16.5 280 70 74 18.5 288 72 81.5 20.5 295 73.5 88.5 22 302 75.5 95.5 24 309 77.5 103 25.5 316 79 111 27.5 323 81 117 29 331 82.5 124 31 (9.5cm/s LOW) (38cm/s HIGH)
RECORD Switch Ass'y function		Check and adjustment with Erasure protect function test JIG (test on microswitch ON/OFF operations)

4-3 AMPLIFIER ELECTRONIC SPECIFICATIONS

Adjustment and Specifications check for the Amplifier system require the test condition of AMP-TO-AMP (off the tape monitoring) mode with equipment of the following assemblies together.

- Chassis Ass'y
- Dress Panel Ass'y
- Operate Panel Ass'y
- HEAD AMP Ass'y
- FM REC/REP AMP PCBA
- BIAS & ERASE AMP PCBA
- MONITOR AMP PCBA
- DC POWER UNIT (A) & (B)
- Each of harness Ass'y and CONTROL AMP PCBA

Unless otherwise specifically noted, all the test are made under the following conditions:

- Power source voltage : DC 12V $\pm$0.2V
- USE-CAL SW : USE
- SOURCE-TAPE SW : SOURCE
- COMP ON-OFF SW : OFF
- 1V FIX-OUTPUT SW : 1V FIX
- T.S.-DATA SW : DATA
- TAPE SPEED 2.38cm/s

Test items for the Amplifier Electronics are given consecutively from the Adjustment & Alignment, Specifications and to Overall Specifications.

4-3-1 Checking Power Unit

PREPARATION: Set the VR R4 approx. center on the CONTROL AMP ASS'Y before appling power.

CHECK ITEM	SPECIFICATIONS	CHECK POINT/ ADJUSTER	ADJUSTMENT CONDITIONS
±6V Check	±6V (±25mV)	±6V lines of MOTHER BOARD (A)	DC POWER UNIT (A)
+10V Check	+10V (±25mV)	+10V lines of MOTHER BOARD (A)	DC POWER UNIT (A)
-11V Check	-11V (±25mV)	-11V lines of MOTHER BOARD (A)	DC POWER UNIT (A)
+11V Check	+11V (±400mV)	P801; 1 & 2 (0V) of CONTROL AMP	DC POWER UNIT (B)
+10.5V Check	+10.5V (±600mV)	P801; 3 & 2 (0V) of CONTROL AMP	DC POWER UNIT (B)

4-3-2 Power Supply Check and Adjustment (on the CONTROL AMP PCBA)

(TP-2: 0V)

CHECK ITEM	SPECIFICATIONS	CHECK POINT/ ADJUSTER	ADJUSTMENT CONDITIONS
+5V (A) Adj.	+5V (±20mV)	TP1 R4	
+5V (B) Check	+5V (+0.5/-0V)	at D5 cathode	
+5V (C) Check	+5V (+0.5/-0V)	at D6 cathode	
+21V Check	+21V (+2/-1V)	TP3	

4-3-3 Input AMP System (on the Input AMP Ass'y)

TP1: FM REC/REP AMP

CHECK ITEM	SPECIFICATIONS	CHECK POINT/ ADJUSTER	ADJUSTMENT CONDITIONS
Input Zero Adj.	0V ±5mV	TP1 (on FM REC/ REP AMP) R22 to R28	INPUT (BNC): 0V (at TP0)
Input Level Adj.	±2.67V (±15mV)	TP1 (on FM REC/ REP AMP) R8 to R14	INPUT (BNC): DC±1V
Input Offset	±100mV	TP1	INPUT (BNC):OPEN-SHORT

4-3-4 FM AMP System (on the REC/REP AMP)

(0V: TP0)

CHECK ITEM	SPECIFICATIONS	CHECK POINT/ ADJUSTER	ADJUSTMENT CONDITIONS
Carrier center frequency (f_0) Adj.	54kHz (±100Hz)	TP2 R102	INPUT (BNC): 0V
-40% Modulation factor (f_L) Adj.	32.4kHz (±0.5%)	TP2 R101	INPUT (BNC): -1V
+40% Modulation factor (f_H) Check	75.6kHz (±0.5%)	TP2	INPUT (BNC): +1V
U16-1 Offset Adj.	0V (±1mV)	TP3 R105	- SOURCE-TAPE SW: TAPE
U16-1 Zero Adj.	0V (±5mV)	TP3 R103	- SOURCE-TAPE SW: SOURCE - TAPE SPEED: 2.38cm/s INPUT (BNC): 0V
U16-1 OUTPUT level Adj.	-1V (±10mV)	TP3 R104	- SOURCE-TAPE SW: SOURCE - TAPE SPEED: 2.38cm/s INPUT (BNC): -1V
U16-1 Zero Offset Check	±7mV	TP3	- TAPE SPEED: 2.38 to 19.05cm/s (Based on 2.38cm/s ref.) INPUT (BNC): 0V
COMP. GAIN Adj.		TP3	- COMP ON-OFF SW: OFF INPUT BNC (all CH): 0.2Vp-p (-20 dB), 20Hz sinewave

4-3-5 CAL Signals (on the SW & CAL AMP B Ass'y)

CHECK ITEM	SPECIFICATIONS	CHECK POINT/ ADJUSTER	ADJUSTMENT CONDITIONS
DC CAL 0V Adj.	0V ±7mV	TP1 R27	+/0/- : 0 position
DC CAL ±1V	±1V (±7mV)	TP1 R18 (+1V) R22 (-1V)	+/0/- : +/-
AC CAL VOLT Adj.	0.636 (±0.04V rms)	TP2 R14	
AC CAL FREQ. Check	490Hz (±50Hz)	TP2	

4-3-6 Meter Indicator & Monitor (on the Operator & Meter AMP Ass'y)

CHECK ITEM	SPECIFICATIONS	CHECK POINT/ ADJUSTER	ADJUSTMENT CONDITIONS
Mechanical Zero Adj.	-120% (-∞)	Screw Adj. below center of meter	POWER : OFF
Meter Zero Adj.	Meter center 0% indication (Visual)	R19	AC-DC POWER SW: DC CH SELECT : CH-1 INPUT BNC : 0V
Meter Sensitivity Adj.	100% indication of meter (Visual)	R14	AC-DC POWER SW: DC CH SELECT : CH-1 INPUT BNC : DC-1V
Meter Power indication Adj.	Power red zone of meter (scale left) by visual	R20	AC-DC POWER SW: POWER Power input : DC 11V
Meter Sensitivity Check	+100% scale ±5% indication (Visual)		AC-DC POWER SW: DC CH SELECT : CH-1 INPUT BNC : DC +1V
Meter AC Sesitivity Check	0 dB ±0.5 dB (45 to 55%)		AC-DC POWER SW: AC CH SELECT : CH-1 INPUT BNC : DC +1V
Monitor out Offset Adj.	0V ±7mV	Monitor out (BNC) R24	CH SELECT : CH-1

4-3-7 Monitor AMP

(0V: TP2)

CHECK ITEM	SPECIFICATIONS	CHECK POINT/ ADJUSTER	ADJUSTMENT CONDITIONS
U12 Offset Adj. (COMP. AMP)	0V ±5mV	TP1 R101	COMP ON-OFF SW: OFF

4-3-8 Control AMP

(0V: TP2)

Operations check .... Check is made using the signature analyzer specified. (For detailed instructions and related information, contact TEAC Export sales div.)

4-3-9 FM AMP System (on the FM REC/REP AMP)

(0V: TP0)

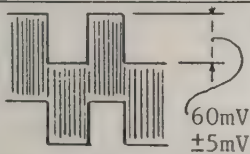
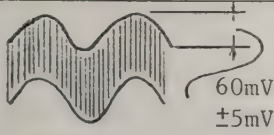
CHECK ITEM	SPECIFICATIONS	CHECK POINT/ ADJUSTER	ADJUSTMENT CONDITIONS
U16-2 Level Adj.	-1V ±10mV	TP4 R108	TAPE SPEED: 2.38cm/s 1PUT (BNC): -1V OUTPUT (BNC): 100k ohm
U16-2 Zero Adj.	0V ±5mV	TP4 R107	TAPE SPEED : 2.38cm/s 1NPUT (BNC) : 0V OUTPUT (BNC): 100k ohm

4-4 OVERALL CHECK & ADJUSTMENT SPECIFICATIONS

This Overall check & adjustment specifications relates to each of major performances that should be obtained with equipping all the prior adjusted systems of 1) Tape transport section, 2) Amplifiers system together. Required test conditions are, unless otherwise specified, the same with the precceded paragraph, 2 Amplifier Check/Adjustment procedures.

4-4-1 Bias & Erase AMP

NOTE: The following prior set-ups are necessary: R91 to R118 are to center, and R119 is set to max., counterclockwise.

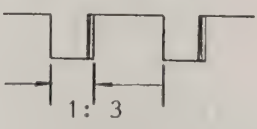
CHECK ITEM	SPECIFICATIONS	CHECK POINT/ ADJUSTER	ADJUSTMENT CONDITIONS
Bias current Adj. BIAS & ERASE AMP	37.8kHz (-3 dB point) 300mVp-p (±10mVp-p)	TP5 of each CH FM REC/REP AMP R89 to R109 (CH-1 to CH-21) TP22, TPE (on BIAS & ERASE AMP) R110	INPUT BNC: +1V TAPE SPEED: 19.05cm/s SOURCE TAPE SW: TAPE Mode : REC FWD INPUT MIC: 0V TAPE SPEED: 19.05cm/s Mode : REC/REP
Rec current Adj. BIAS & ERASE AMP	 	TP1 to TP21 0V: TPE R67 to R87 (CH-1 to CH-21) TP22 0V: TPE R88	INPUT BNC : +1V TAPE SPEED: 2.38cm/s Mode : REC FWD INPUT MIC : 500Hz -30 dB TAPE SPEED: 2.38cm/s Mode : REC FWD
Erase turn-in, Erase current Adj. BIAS & ERASE AMP	1) 400mVp-p or more 2) 380mVp-p ±10mVp-p 134mVrms (±3.5 mVrms)	TP23 TPE 0V VC1 TP23 TPE, 0V R14	Cassette : IN Mode : REC FWD Set VC1 to max. If unable obtain 400mVp-p, repeat 1) and 2) procedure with removed C39 - TPE located on BIAS & ERASE AMP

4-4-2 Head AMP

CHECK ITEM	SPECIFICATIONS	CHECK POINT/ ADJUSTER	ADJUSTMENT CONDITIONS
Rep output Adj.	1.3Vrms (±0.07V rms)	TP5 (each FM REC/REP AMP) R015 to R215 (CH1 to CH21)	INPUT BNC : +1V TAPE SPEED : 2.38cm/s Mode : REC FWD SOURCE-TAPE SW: TAPE
	-19 dB ±3 dB	TP22 TP0 0V R225	INPUT MEMO : 500Hz -40 dB TAPE SPEED : 2.38cm/s MEMO OUT : 8 ohm load
Rep output Check	0.8Vrms to 1.5Vrms	TP5 (each FM REC/REP AMP)	INPUT BNC : +1V TAPE SPEED : 4.76cm/s 9.52cm/s 19.05cm/s SOURCE-TAPE SW: TAPE Mode : REC FWD

4-4-3 Servo AMP

(Refer to TAPE TRANSPORT SECTION)

CHECK ITEM	SPECIFICATIONS	CHECK POINT/ ADJUSTER	ADJUSTMENT CONDITIONS
Servo Gain Check	- Lock in at all speeds - Flutter 0.35% at 19.05cm/s 0.45% at 9.52 cm/s 0.55% at 4.76 cm/s 0.7 % at 2.38 cm/s	TP8, TP2 (0V) on CONTROL AMP	Waveform check  IRIG measurement, Flutter values are represented in FM REC/REP

4-4-4 Mode of Operations Check

CHECK ITEM	SPECIFICATIONS	CHECK POINT/ ADJUSTER	ADJUSTMENT CONDITIONS
USE-CAL Changeover Check	Specified output must be obtained		USE-CAL SW: CAL +/0/- : +/0/- TAPE SPEED: 19.05cm/s SOURCE-TAPE SW: SOURCE TAPE (REC FWD) OUTPUT : MONITOR OUT METER
COMP ON-OFF function Check	CH-1 to 10, +1V CH-12 to 21, +1V CH-11 ON 0V OFF +1V		USE-CAL SW : CAL +/0/- : + TAPE SPEED : 19.05cm/s SOURCE-TAPE SW: TAPE (REC FWD) OUTPUT : MONITOR OUT

CHECK ITEM	SPECIFICATIONS	CHECK POINT/ ADJUSTER	ADJUSTMENT CONDITIONS
Speaker Check	Clearly readable		- Record voice memo in normal level by 20cm to 30cm apart from MIC - Reproduce the tape with 80% VR set of SP LEVEL

AMP-to-AMP 1V Fix-OUTPUT each mode of operation Check

Mode	SOURCE		TAPE	
	MONITOR	OUTPUT	MONITOR	OUTPUT
STOP	A-a (*a)	A-A (*c)	0V	0V
REC FWD	A-A (*a)	A-A (*c)	DATA (REP) (*a)	DATA (REP) (*c)
FWD	DATA (REP) (*b)	DATA (REP) (*c)	DATA (REP) (*b)	DATA (REP) (*d)
FF/REW	0V	0V	0V	0V

INPUT : DC +1V
OUTPUT: Set LEVEL at +2V

NOTE: INPUT OUTPUT MONITOR
A-A: Amp-to-Amp (off the tape signal flow) function.
(*a)=1V/OUT ignore: 1V (FIX) precedes regardress SW positions. +1V,+2V,+1V
(*b)=1V/OUT SELECT: If SW is in 1V (FIX), then ..... +1V,+2V,+1V
If SW is OUT, then ..... +1V,+2V,+1V
(*c)=I/O VR: -------- Constant input level responds with I/O LEVEL VR.
(*d)=)VR: ---------- Level responds only to Output level VR.

Tape Servo Check	12.5kHz	TP5 (T.S. FM) on REC/REP AMP	T.S.-DATA SW : T.S. TAPE SPEED : 19.05cm/s SOURCE-TAPE SW: TAPE USE-CAL SW : CAL +/0/- : + COMP ON-OFF : ON-OFF
	Lock in at all speeds	TP8 on CONTROL AMP	Recorded tape as above is reproduced at all the speeds
CH SELECTOR SW Function Check	With links to CH SELECT SW, LED of each CH lits & operates METER, MONITOR OUT		Apply signal to INPUT BNC with link to CH SEL. SW
Power Led Check	No deviation on light intensity		
Output Zero Level	±10%	OUTPUT BNC R107 on FM REC/ REP AMP	INPUT BNC : 0V INPUT ZERO LEVEL: 0V OUTPUT LEVEL : ±1V

CHECK ITEM	SPECIFICATIONS	CHECK POINT/ ADJUSTER	ADJUSTMENT CONDITIONS
Meter Sensitivity Check	±50% (±5%)		AC-DC-POWER SW: DC INPUT (CH1 BNC): DC ±1V SOURCE-TAPE SW : SOURCE Mode : FWD 1V FIX-OUT SW : OUT CH1 OUTPUT LEVEL: DC ±2V

Each mode of Operation Check

operation command \ mode	STOP	F.F	REW	FWD	REC FWD	EJECT	Loading
STOP	---	STOP	STOP	STOP	STOP	----	STOP
F.F.	F.F.	---	F.F.	F.F.	F.F.	----	F.F.*
REW	REW	REW	---	REW	REW	----	REW*
FWD	FWD	FWD	FWD	---	---	----	FWD*
REC FWD	REC FWD	REC FWD	RED FWD				REC FWD*
EJECT	EJECT	---	---	---	---	----	----

---: No change on status.

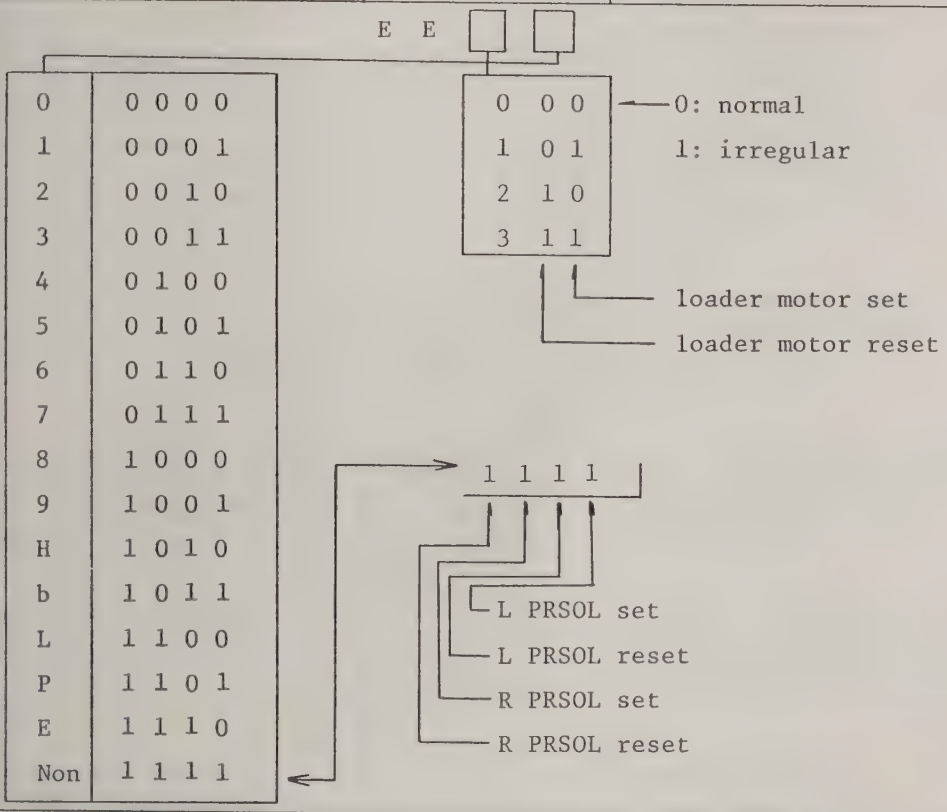
NOTES:

- Above listed should be all checked affirmative.
- Mark*, The specified mode will be done after loading the tape.
- Dual push in error with EJECT during STOP mode initializes:
  When pushes completely spontaneous or EJECT advances → EJECT
  When EJECT is pushed in a bit of play → Other mode
- Dual push in error with REC (other than FWD) from an arbitrary mode (other than EJECT) will result the arbitrary mode with REC ignored.
- Dual push in error (e.g.,FF+REW,FF+FWD or REW+FWD) from an arbitrary mode will result STOP.
- During checking out of above mode, confirm that it will be no error indication.
- ERROR indication: If inoperative on load/unload or PR SOL set/reset, E E □ □ is displayed on Tape Counter Display.
  During this, □□ will show the failed point of the tape portion.

  (Also refer to the next paragraph).
  Mode display shows and holds the mode in error. During ERROR is display shows and holds the mode in error. During ERROR is displayed, no mode operation other than STOP will be resulted.
- Releasing ERROR display: push STOP mode after caring the failed portion, then the mode in error will be released and go to STOP, lit STOP lamp, and Counter will be reset (0000).
- When no cares given for the failed portion: It is possible to release ERROR display by commanding STOP.

CHECK ITEM	SPECIFICATIONS	CHECK POINT/ AJUSTER	ADJUSTMENT CONDITIONS

Error Display



Loading Operation Check

During loading the tape;
when selects an arbitrary mode → From STOP lamp blinking to SELECT mode Blinks

when not selecting → STOP blinks

Blinks: During loading & EJECT function.

Cassette in, load

EJECT operation Check

Cassette	Cassette compart-ment	EJECT	mode
OUT	OPEN	no oprn	STOP blinks,
OUT	Push	EJECT	STOP blinks, no oprn during EJECT
IN	OPEN	no oprn	STOP blinks, no oprn
IN	Push	no oprn during loading	STOP blinks, no oprn during EJECT
		loading up EJECT	STOP blinks, no oprn

NOTE: no oprn = No operation

CHECK ITEM	SPECIFICATIONS		CHECK POINT/ ADJUSTER	ADJUSTMENT CONDITIONS	
Tape Counter Check	Button	Push Duration	Display	Function	Remarks
	RESET	no effect	0 0 0 0	0 0 0 0 release	Eneble at every mode
	SET	Within 1 sec	0 0 0 0	Digit carry & assin	Eneble at STOP
				Assigned digit blinks	Unable during STOP blinking
		More than 1 sec	1 0 0 0	Assigns numeric on blinking digit	
Power OFF Protect of Tape Counter	Less than 75mV (Voltage drop)		TP2 D5 cathode on CONTROL AMP	OFF 10 mins after POWER ON Check amount of drop 10 mins after POWER OFF.	
Tape Counter Accuracy	11.4 $\pm$0.2			- Resets 5 mins after FWD - Check COUNTER numeric - Beginning-of-tape (BOT) - TAPE SPEED : 19.05cm/s	
	20 count or less			F.FWD ⟷ REW at 1 both ways	
Power down Check	Check that the tape is normally stored in a tape case (halfs) if powered off during operating every mode.			Power down 10 mins after POWER ON	
Tape Speed switching for Mode of operation & Display	Should be mormal. Moire periodicity is as follows: cm/s μs 19.05 20 9.52 40 4.76 80 2.38 160			When TAPE SPEED SW is set to RMT without Remote Control Unit, tape speed must be 2.38cm/s and its lamp lits. RMT lamp should goes off.	
EOT/BOT Function Check	EOT ⟶ REW, EJECT BOT ⟶ F.F., FWD, REC FWD, EJECT Arbitrary mode ⟶ EOT/BOT ⟶ STOP Check that functions of above should normally be obtained.				

4-5 REMOTE CONTROL UNIT CONNECTION CHECK

Using Test Remote Control JIG, check the following:

Side-A of SW TAPE SPEED : RMT

- TAPE SPEED SW changing over and display
- Each mode of operations SELECT and DISPLAY
  (The main body also functions together to display)
- Microphone ON/OFF operations check (Remote function precedes)
- Displaying EOT/BOT
- COUNTER reset (display will be appeared on the main body)
- COUNTER PULSE: 19.05cm/s to 2.38cm/s
  12Hz to 1.5Hz approx. are display
- STOP function is made with Test Remote Control JIG when an arbitrary mode is in operation by switching TAPE SPEED SW from RMT to any speed position.
- These operations are always taken a preference by Remote Control side command.

Side-B of SW TAPE SPEED: arbitrary position

- Each mode of operations SELECT and DISPLAY
  (The main body also functions together to display).

4-6 OVERALL SPECIFICATIONS

The criteria for these specifications applies to the Factory Test Sheet for the indivisual data recorder checked and adjusted based on the preceded item 1. Transport Specifications check and adjustment, 2. Amplifier Specifications check and adjustment, and 3. Overall Operations check and adjustment. Test conditions and methods are pursuant to as that of generally applicable procedures for the conventional data recorder/reproducer.

CHECK ITEM	SPECIFICATIONS	CHECK POINT/ ADJUSTER	ADJUSTMENT CONDITIONS
Input impedance	1 Mohm (±20%)	INPUT BNC	Resistor substitution method
Input zero level	±102% to ±110%	MONITOR OUT	Check output level with turning INPUT ZERO LEVEL VR knob
Carrier center frequency	54kHz ±200Hz	TP2 FM REC/REP AMP	INPUT BNC: 0V
Modulation factor	43.2kHz ±864Hz (±2%)	TP2 FM REC/REP AMP	INPUT BNC: ±1V Modulation factor = $f_H - f_0$
Output impedance	82 ohm ±15%	OUTPUT BNC	Resistor substitution method
Monitor output voltage	±1V ±20mV	MONITOR OUT BNC	INPUT BNC: ±1V CH SELECT: CH1 Mode :STOP (AMP-to-AMP) Load : 100 kohm
	±2V ±40mV	MONITOR OUT BNC	INOUT BNC: ±1V CH SELECT: CH1 1V FIX-OUT: OUT OUTPUT BNC: ±2V SOURCE-TAPE SW: SOURCE Mode : FWD (AMP-to-AMP) Load : 100 kohm
Output voltage	±2V or more	OUTPUT BNC	INPUT BNC : ±1V Load : 100 kohm
Output current	±10.5mA or more	OUTPUT BNC	INPUT BNC : ±1V Load : 20 ohm (Output:100 kohm ±2V set)

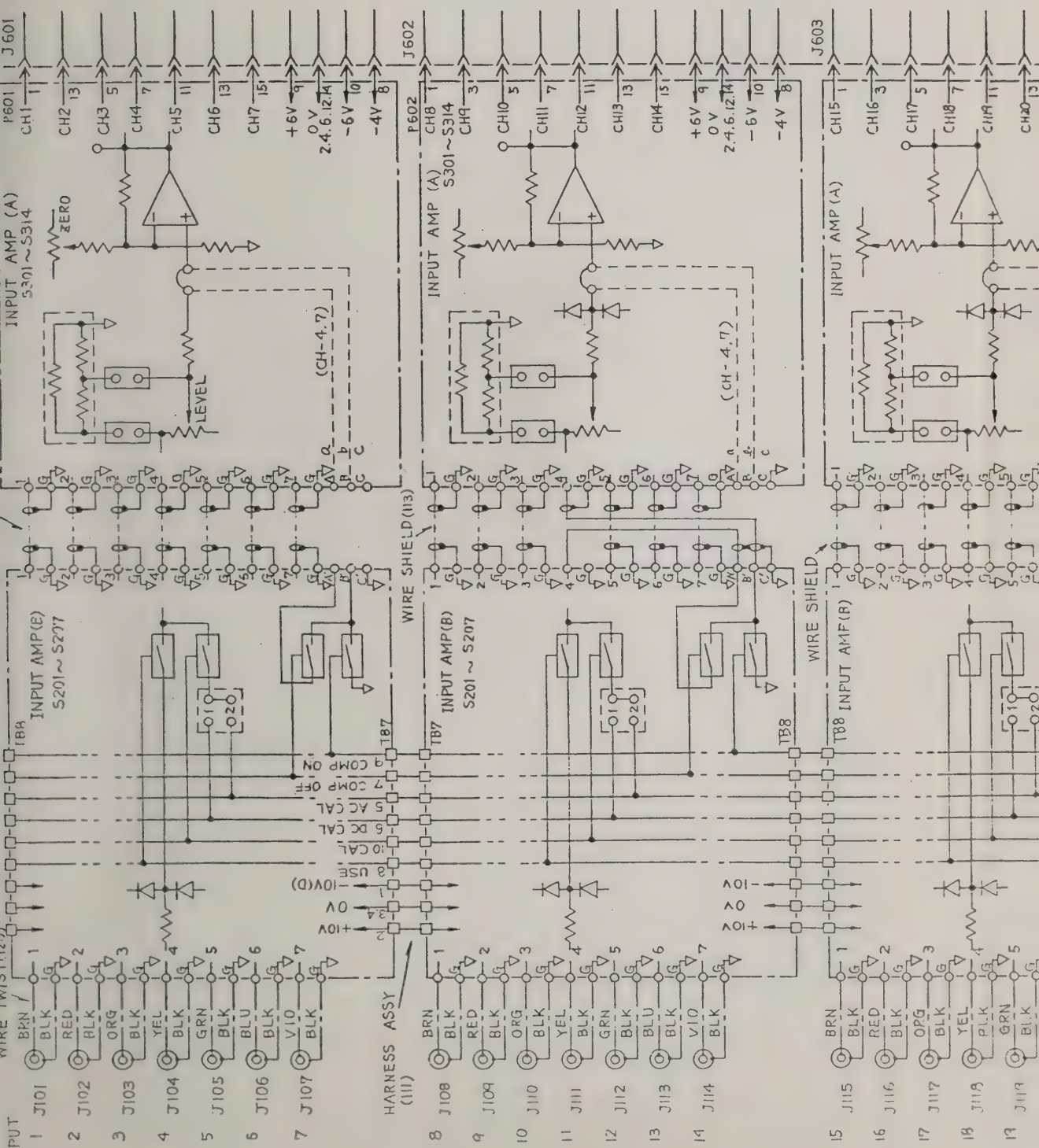
CHECK ITEM	SPECIFICATIONS	CHECK POINT/ ADJUSTER	ADJUSTMENT CONDITIONS
Frequency response cm/s kHz 19.05 DC~5 9.52 DC~2.5 4.76 DC~1.25 2.38 DC~0.625	Frequency +0.5 -1.0 dB Phase +0.5 -10 dB	MONITOR OUT BNC	SOURCE-TAPE SW: SOURCE Use at CH SELECTOR
Linearity	±0.45%	MONITOR OUT BNC	INPUT BNC: ±1V, ±1.2V - Apply a ±1.7V to INPUT - Check the ±1.7V or less at OUTPUT terminal
Signal - to - Noise ratio (at COMP ON) 19.05cm/s 9.52cm/s 4.76cm/s 2.38cm/s	 50 dB 48 dB 47 dB 46 dB	 OUTPUT BNC	
Closstalk	Noise level or less	OUTPUT BNC	- Measuring CH: INPUT Short COMP ON-OFF : OFF
Distortion	0.9%	OUTPUT BNC	19.05cm/s .... 200Hz 2.38cm/s 20Hz
CAL voltage	±1V, 0V (±7mV)	TP1 (CAL & METER AMP)	- INPUT BNC: ±1V, 0V Align INPUT LEVEL, ZERO for ±1.000V, 0.000V at TP1. Selects USE-CAL SW to CAL and measure CAL voltages specified.
Memo announce 1) Input sensitivity	5 dB (±3 dB)	P705 Pin 6 TP2: 0V (at MONITOR AMP)	MEMO INPUT: -40 dB, 500Hz 0 dB = 0.775Vrms
2) Frequency response	±3 dB	MEMO OUT	19.05cm/s 300~2kHz 9.52cm/s 300~1.5kHz 4.76cm/s 300~1kHz 2.38cm/s 300~1kHz
3) Signal -to- Noise ratio	20 dB or less	MEMO OUT	The following speces are met to input sensitivity at each tape speed.

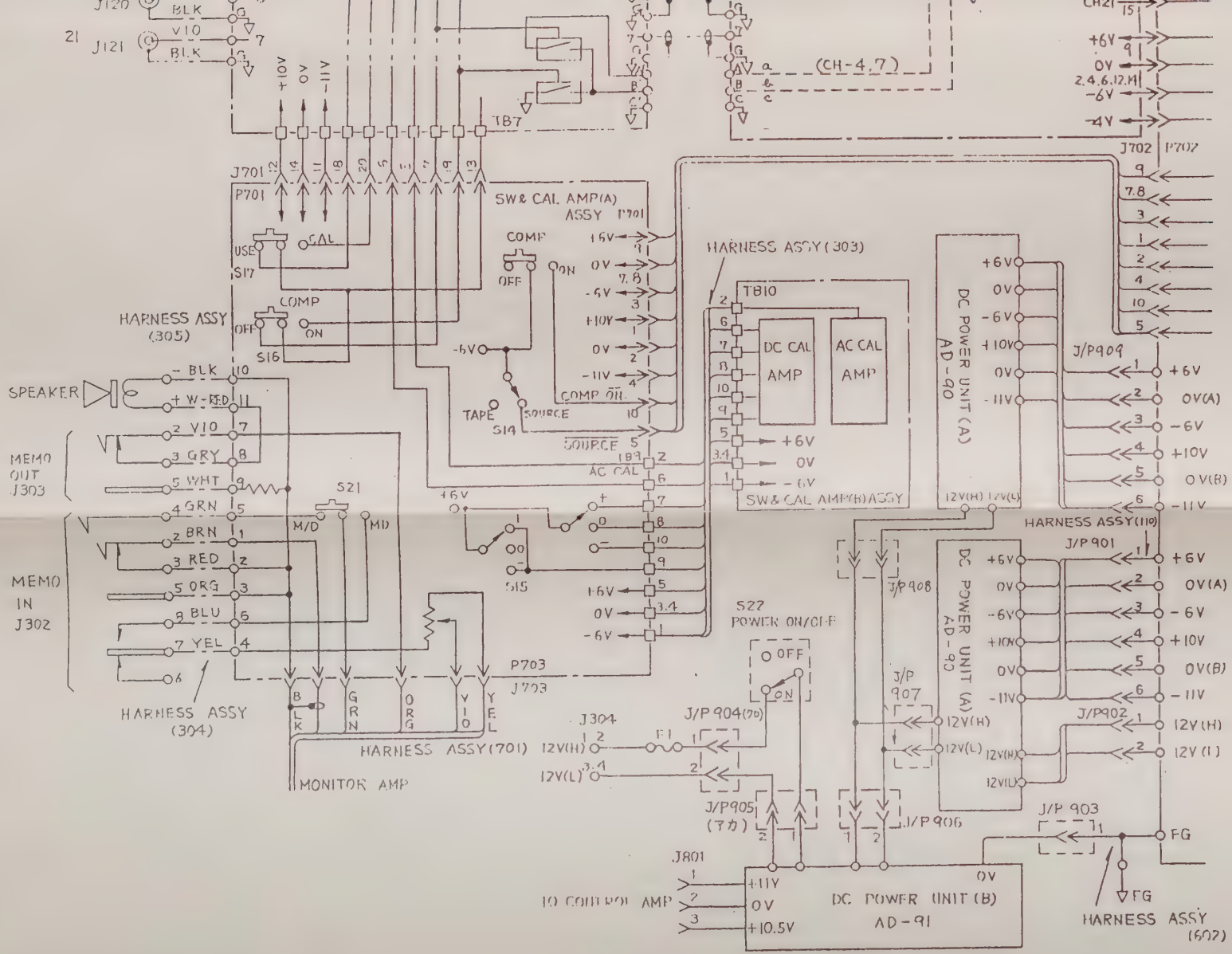
CHECK ITEM	SPECIFICATIONS	CHECK POINT / ADJUSTER	ADJUSTMENT CONDITIONS
Level convertion character-istics	Each tape speed ±20mV	OUTPUT BNC	Record 0V at 19.05cm/s set output level to ±1V then reproduce at other tape speed.
Erase current	380mVp-p (±10mVp-p)	TP15 R56, 0V (on BIAS & ERASE AMP)	
Drift	±0.5%	OUTPUT BNC	After heart run 20 mines TAPE SPEED: 2.38cm/s
Jitter	±8u or less	REC/REP AMP 14CH U8 Pin7	Refer to Factory Test Sheet procedures for Test method
Time base error	±16u sec or less	REC/REP AMP 14CH U8 Pin 7 U6 Pin 13	Same as above
Power voltage fluctuation	±25Hz	TP2 (on REC/REP AMP)	Check the drift on carrier center frequency when varying from 11V to 15V with reference of 12V of POWER voltage (at CH1)

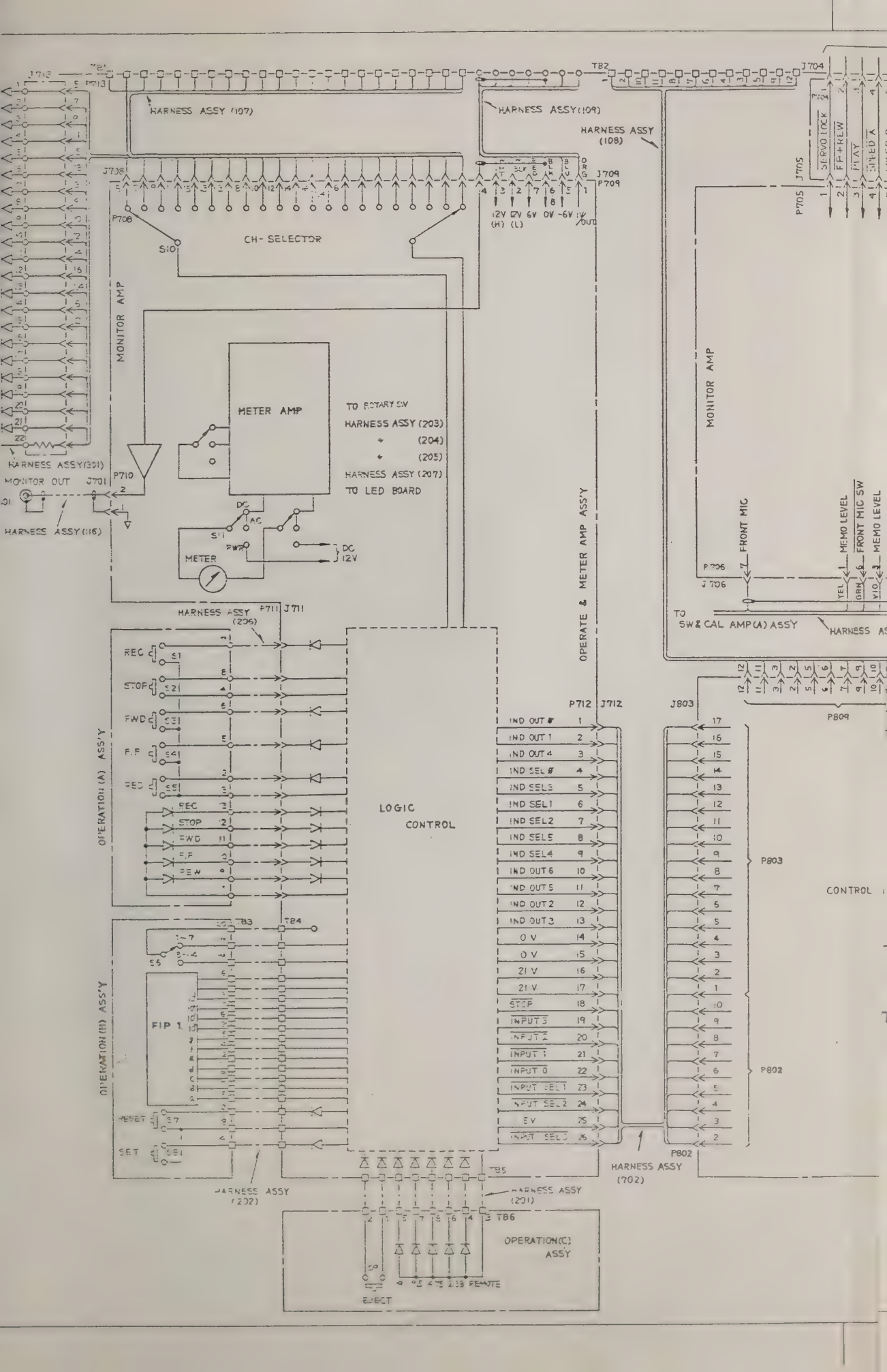
SECTION 5

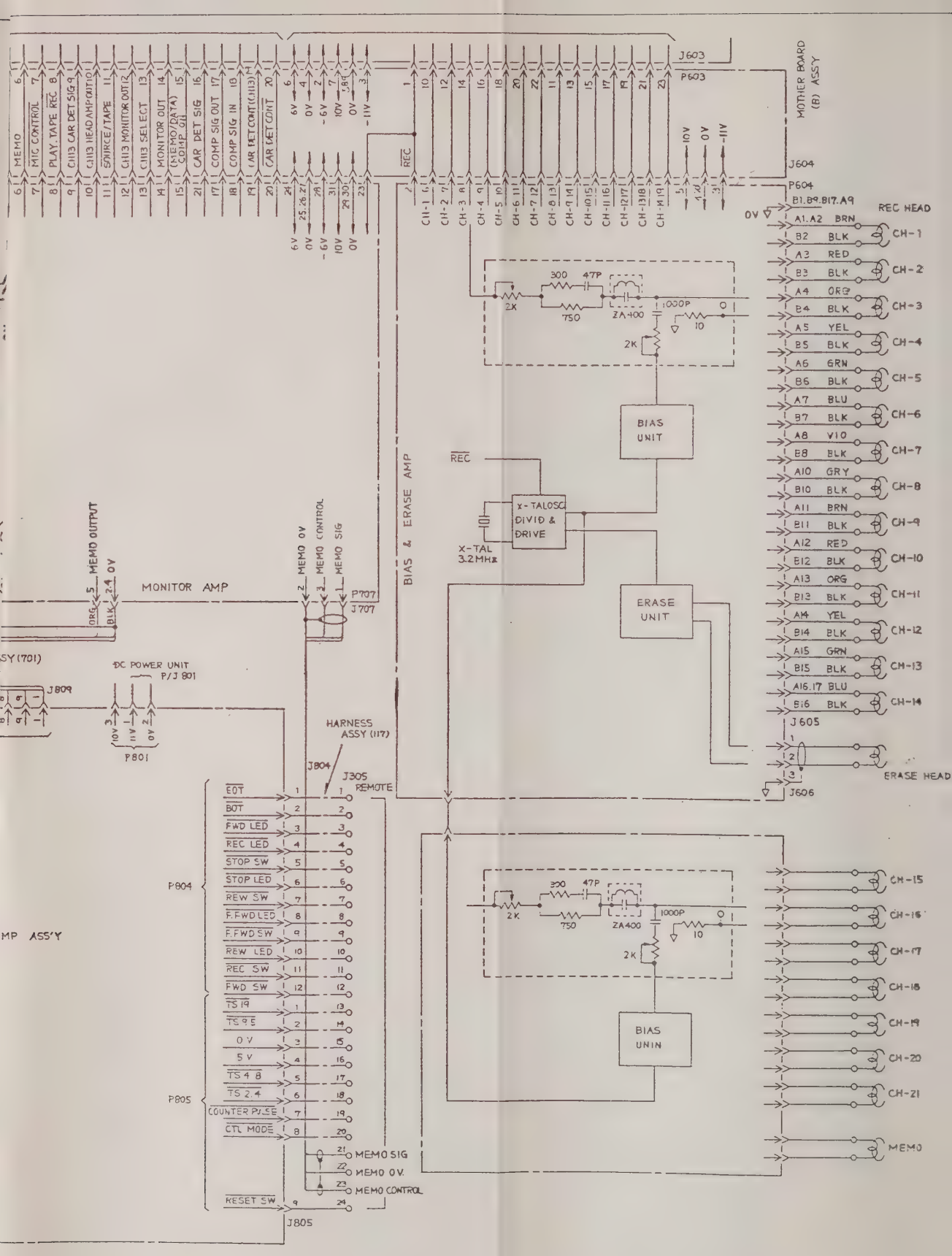
PRINTED CIRCUIT BOARD ASS'Y (PCBA) AND PARTS LIST

1 SYSTEM CONNECTION DIAGRAM-1




J120
BLK
21
J121
V10
BLK
+10V
0V
-11V
TB7
J701
P701
SW& CAL AMP(A) ASSY P701
COMP
ON
OFF
+6V
0V
-6V
+10V
0V
-11V
COMP ON
USE
CAL
S17
COMP
OFF
ON
S16
HARNESS ASSY (305)
-6V
TAPE
SOURCE
S19
SOURCE 5
AC CAL
SPEAKER
- BLK
+ W-RED
2 V10
3 GRY
5 WHT
4 GRN
2 BRN
3 RED
5 ORG
8 BLU
7 YEL
6
MEMO OUT J303
MEMO IN J302
S21
M/D
MD
+6V
S15
P703
J703
HARNESS ASSY (304)
B L K
G R N
O R G
V I O
Y E L
MONITOR AMP
HARNESS ASSY(701)
J304
12V(H)
12V(L)
F1
J/P 904(7P)
S27 POWER ON/OFF
OFF
ON
J/P 907
J/P 908
J/P905 (7P)
J/P 906
J801
+11V
0V
+10.5V
IO CONTROL AMP
DC POWER UNIT (B) AD-91
0V
FG
J/P 903
HARNESS ASSY (602)
HARNESS ASSY(303)
TB10
DC CAL AMP
AC CAL AMP
SW& CAL AMP(B) ASSY
DC POWER UNIT (A) AD-90
12V(H) 12V(L)
HARNESS ASSY(110)
J/P909
J/P901
J/P902
+6V
0V(A)
-6V
+10V
0V(B)
-11V
12V(H)
12V(L)
J702
P702
(CH-4,7)
CH21
+6V
0V
2,4,6,12,M
-6V
-4V

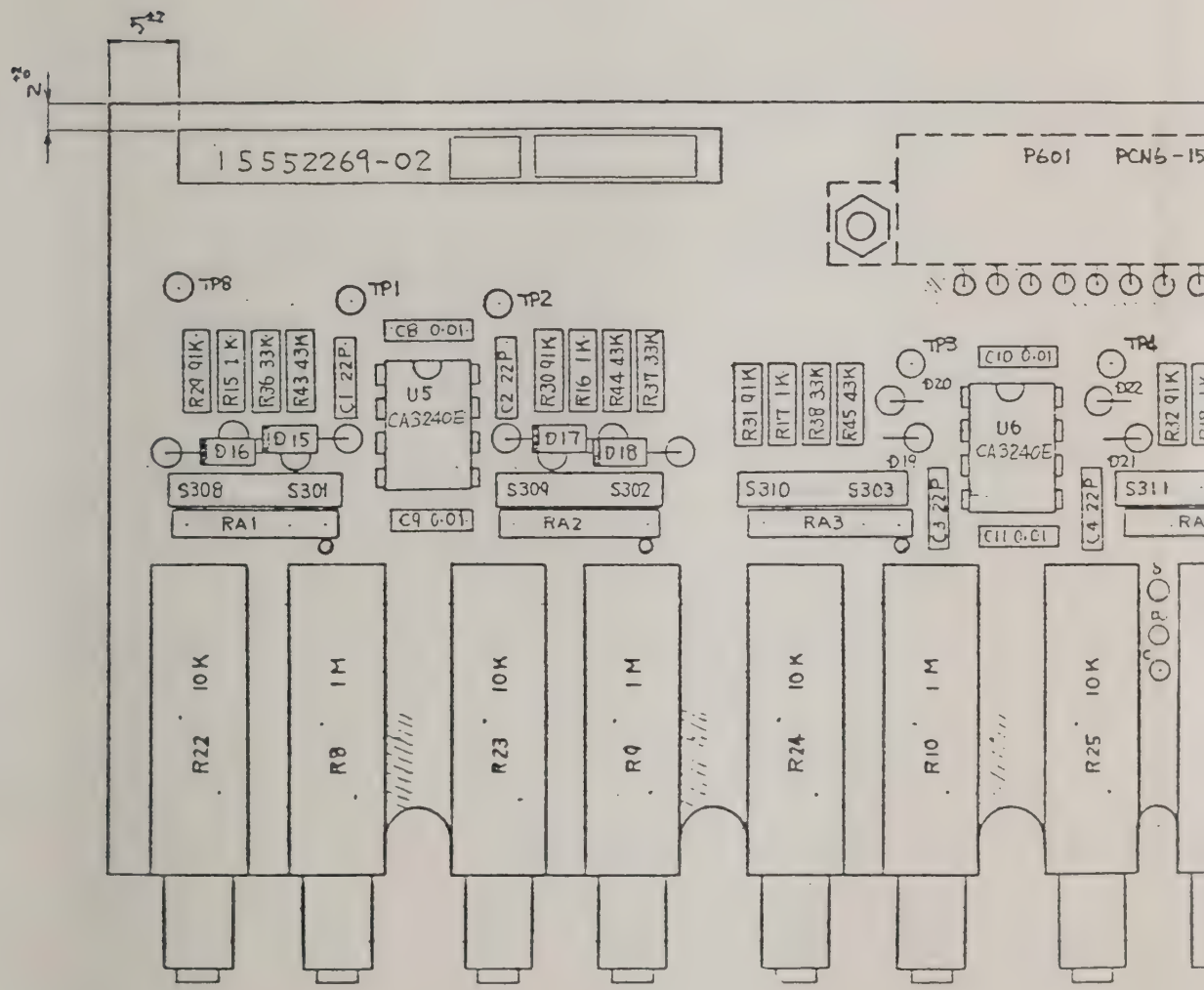

HARNESS ASSY (107)
HARNESS ASSY (109)
HARNESS ASSY (108)
CH-SELECTOR
S10
MONITOR AMP
METER AMP
TO ROTARY SW
HARNESS ASSY (203)
(204)
(205)
HARNESS ASSY (207)
TO LED BOARD
HARNESS ASSY (301)
MONITOR OUT
HARNESS ASSY (116)
METER
OPERATE & METER AMP ASSY
SERVO LOCK
FF+REW
PLAY
SPEED A
FRONT MIC
MEMO LEVEL
FRONT MIC SW
TO SW & CAL AMP(A) ASSY
HARNESS ASSY (206)
OPERATION (A) ASSY
REC
STOP
FWD
F.F
REW
LOGIC CONTROL
OPERATION (B) ASSY
FIP 1
RESET
SET
HARNESS ASSY (202)
HARNESS ASSY (201)
HARNESS ASSY (702)
OPERATION (C) ASSY
EJECT
REMOTE
CONTROL



SYSTEM CONNECTION DIAGRAM-2

INPUT AMP ASS'Y

1 INPUT AMP (A) PCBA (15552269-00)



A-25DS
TP5
TP6
TP7
C12 0-01
C13 0-01
C5 22P
C1 22P
U7
CA3240E
U8
CA3240E
D23
D24
D25
D26
D27
D28
R46 43K
R39 33K
R33 91K
R19 1K
R40 33K
R47 43K
R34 91K
R20 1K
R48 43K
R41 33K
R40 43K
R35 91K
R21 1K
R42 33K
S304
S312
S305
RA5
S313
S306
RA6
S314
S307
RA7
R11 1M
R26 10K
R12 1M
R27 10K
R13 1M
R28 10K
R14 1M
A
B
C

Parts marked with an * require longer delivery time.

. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
		- Resistors -		
~ R21	11037102	RN 1/4W 1k ohm 1%	7	
~ R35	11037913	RN 1/4W 91 ohm 1%	7	
~ R42	11037333	RN 1/4W 33 ohm 1%	7	
~ R49	11037433	RN 1/4W 43 ohm 1%	7	
~ RA7	13493409-00	Array 10k x 51k x 51k 1%	7	
		- Variable resistors -		
~ R14	13256702	VR 1M ohm ±10%	7	
~ R28	13256694	VR 10k ohm ±10%	7	
		- Capacitors -		
~ C15	12901626	CC 50V 0.01MF	8	
~ C7	12901550	CC 50V 22pF 2%	7	
~ D28	13413020	Diode IS953	14	
~ U8	13447160	IC CA3240E	4	
1~S314	13151153	Connector Z-152-2P	14	
1	13150811	Connector Plug	1	
~ TP8	13189145	Terminal	8	

NOTE:

- CAPACITORS -

CC = Ceramic, Magnetic capacitor.

CS = Tantalum.

CQ = Metallized film capacitor, Film capacitor, Metallized polypropylene film.

CE = Aluminium electrolytic capacitor.

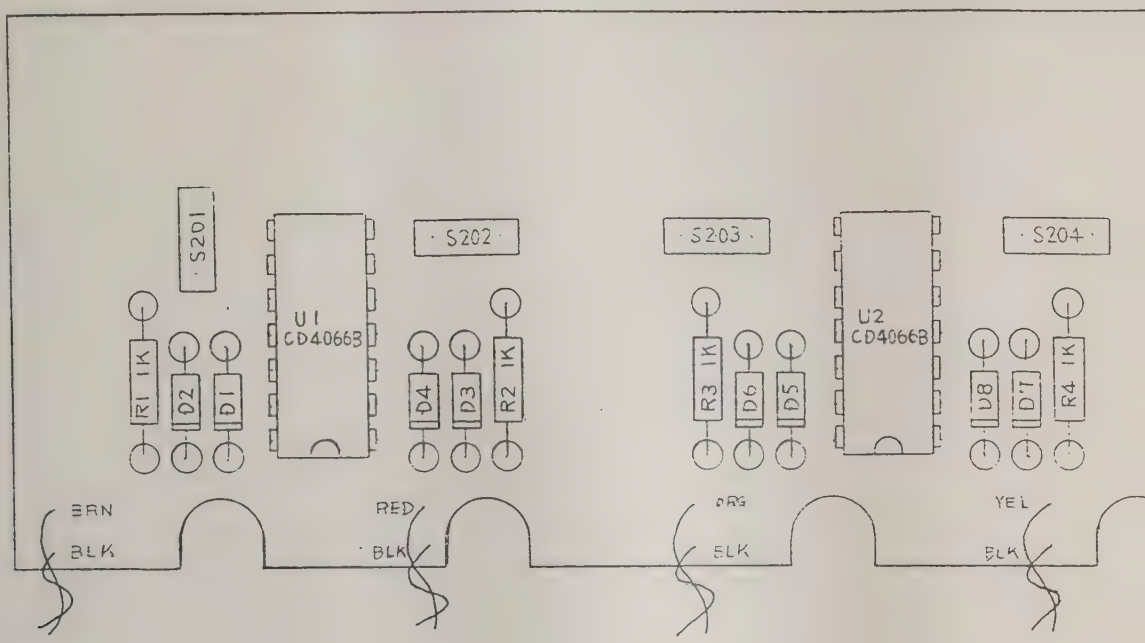
- RESISTORS -

RD = Carbon.

RN = Metal film.

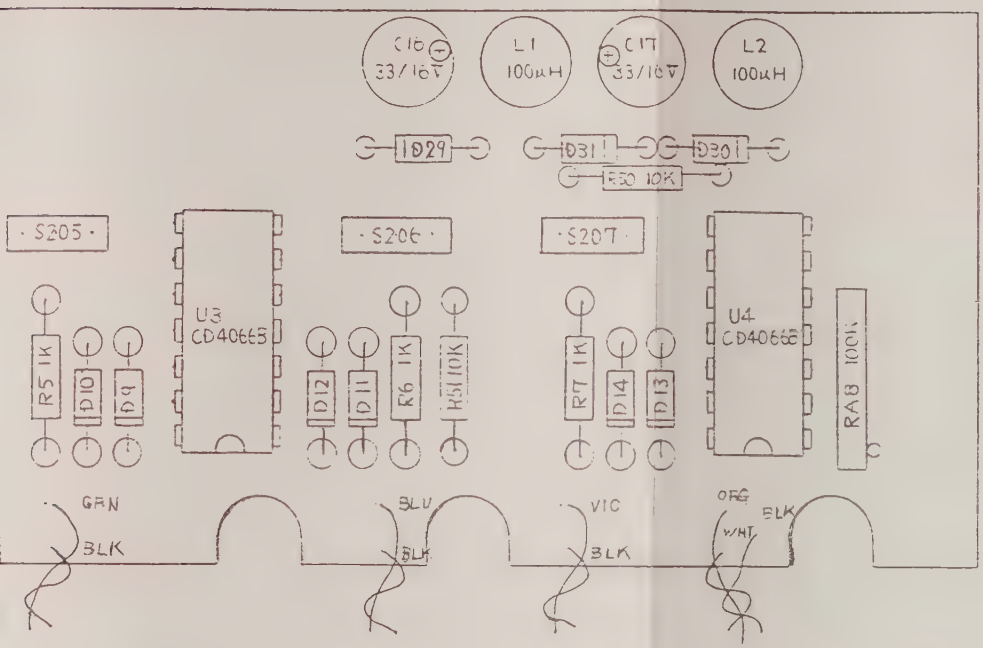
VR = Variable resistor.

5-2-2 INPUT AMP (B) PCBA (15552268-00) and Parts List

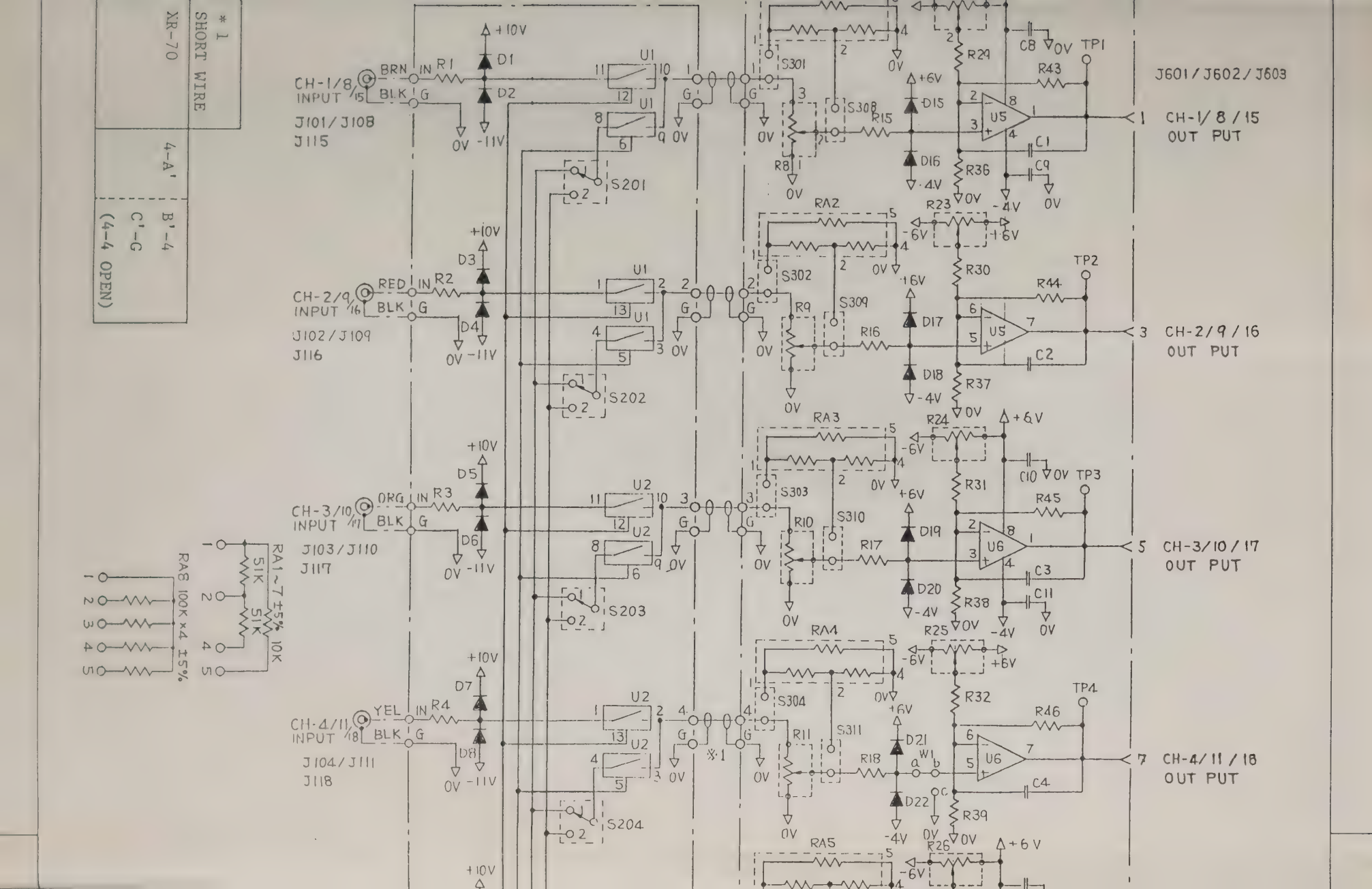


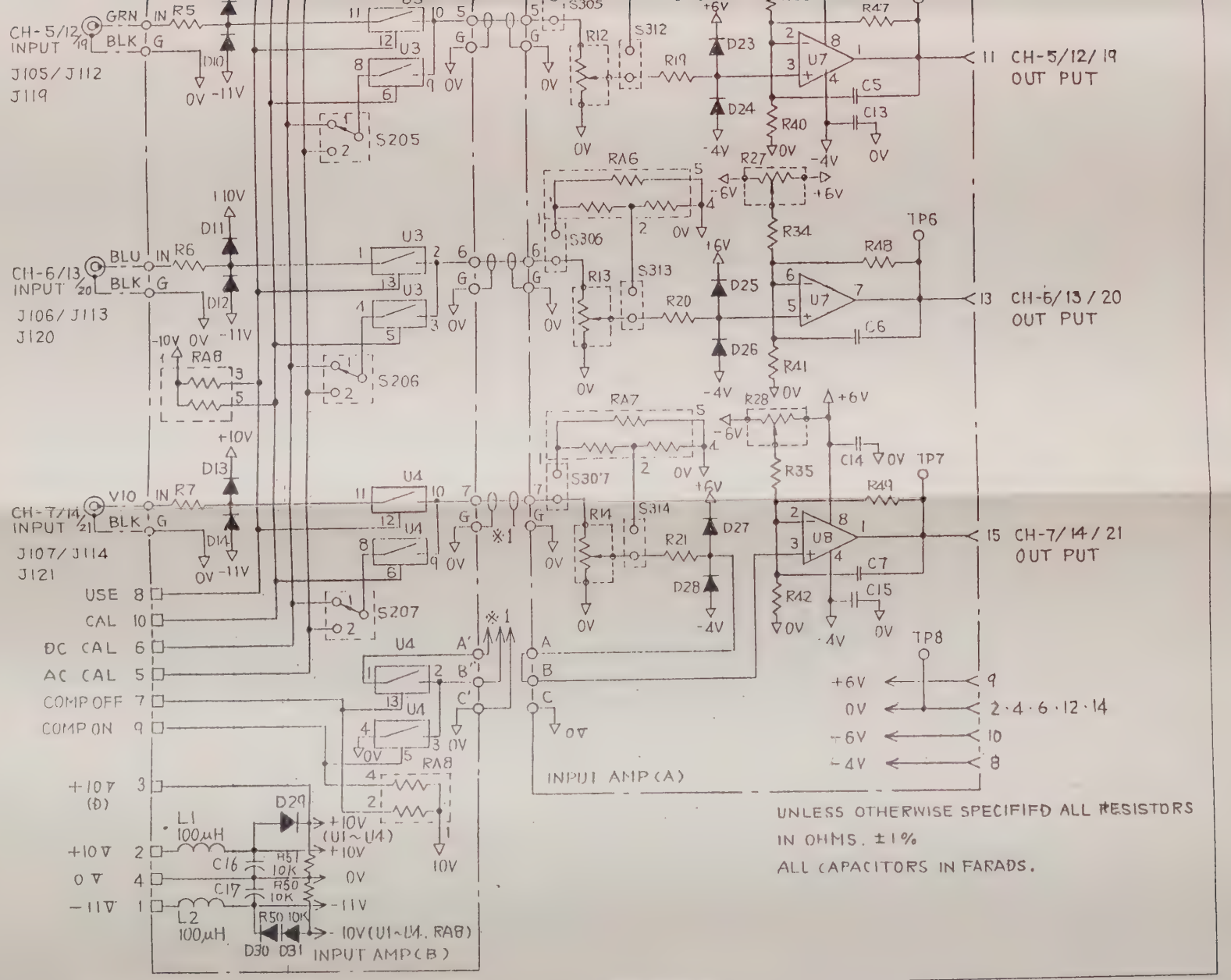
Parts marked with an • require longer

REF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMAR
		- Resistors -		
R1 R7	11193102	RD 1/4W 1k ohm 5%	7	
R50,51	11193103	RD 1/4W 10k ohm 5%	2	
RA8	13492321	Array 4-element 100k 5%	1	
C16,17	12901902	CE 16V 33MF ±20%	2	
L1.2	14722080	Coil, Choke 100uH	2	
S202 S207	13224118	Switch, Slide SSS1-2	7	
		- Diodes -		
D1 D14, 30,31	13413020	" 1S953	16	
D29	13411191	" 1SS16	1	
U1 U4	13441599	IC CD 4066B	4	


C16
33/16V
L1
100µH
C17
33/16V
L2
100µH
D29
D31
D30
R50 10K
S205
S206
S207
U3
CD4066B
U4
CD4066B
R5 1K
D10
D9
D12
D11
R6 1K
R51 10K
R7 1K
D14
D13
RA8 100K
GRN
BLK
BLU
BLK
VIO
BLK
ORG
WHT
BLK

very time.

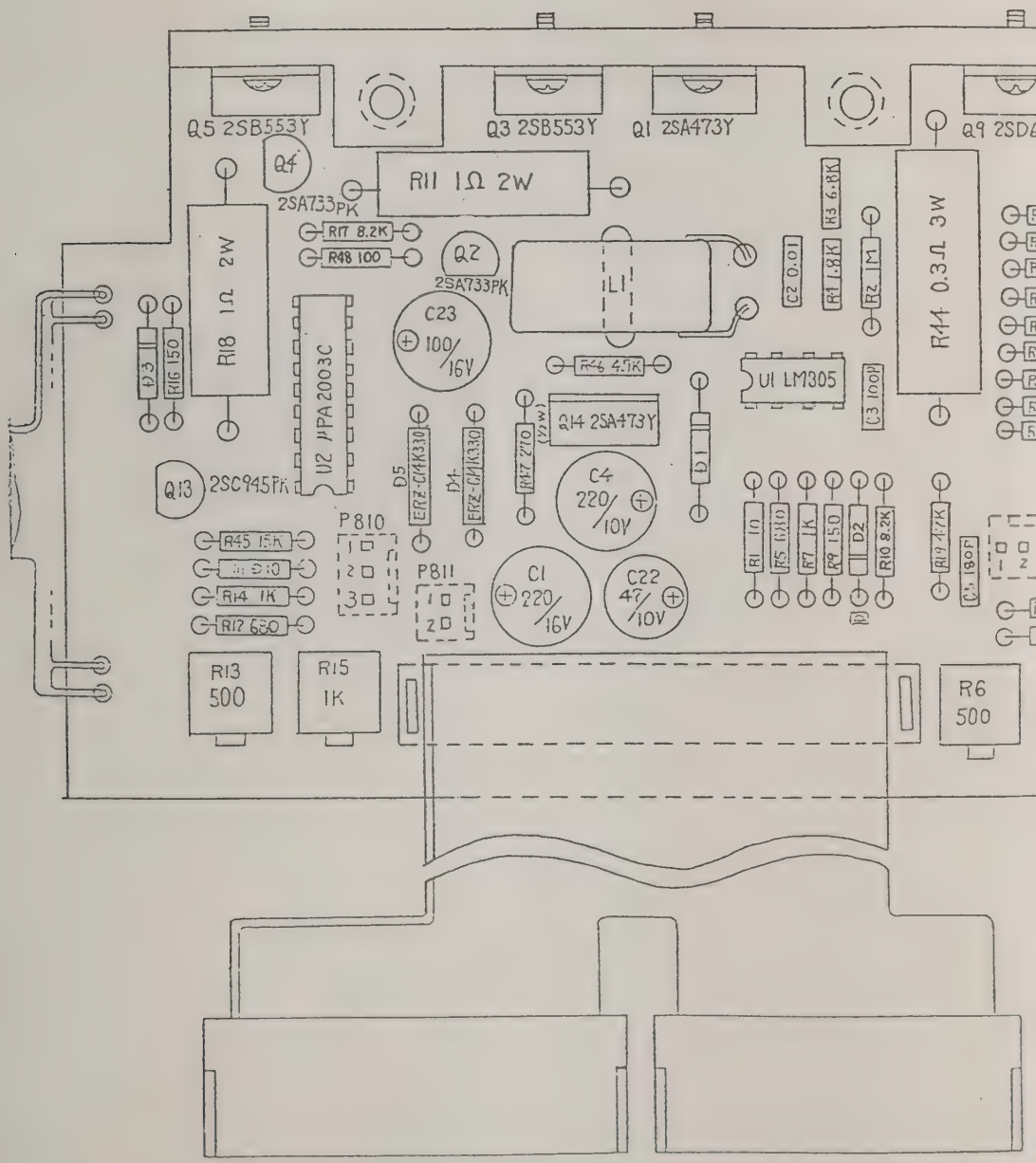

XR-70
* 1
SHORT WIRE
4-A'
B'-4
C'-G
(4-4 OPEN)
CH-1/8/15 INPUT
BRN
BLK
IN
G
R1
D1
D2
+10V
-11V
0V
U1
S201
J101/J108
J115
CH-2/9/16 INPUT
RED
R2
D3
D4
S202
J102/J109
J116
CH-3/10/17 INPUT
ORG
R3
D5
D6
S203
J103/J110
J117
CH-4/11/18 INPUT
YEL
R4
D7
D8
S204
J104/J111
J118
U2
RA8 100K×4 ±5%
RA1~7 ±5% 10K
51K
S301
S302
S303
S304
S308
S309
S310
S311
R8
R9
R10
R11
R15
R16
R17
R18
RA2
RA3
RA4
RA5
R23
R24
R25
R26
R29
R30
R31
R32
R36
R37
R38
R39
R43
R44
R45
R46
D15
D16
D17
D18
D19
D20
D21
D22
-6V
+6V
-4V
U5
U6
C8
C9
C1
C2
C10
C3
C11
C4
TP1
TP2
TP3
TP4
W1
※1
J601/J602/J603
1 CH-1/8/15 OUT PUT
3 CH-2/9/16 OUT PUT
5 CH-3/10/17 OUT PUT
7 CH-4/11/18 OUT PUT



5-2-3 Schematic Diagram —INPUT AMP (A) & (B)—

5-3 SERVO AMP ASS'Y

5-3-1 SERVO AMP (A) Ass'y (15552281-00)



SERVO AMP(A)
Q10 2SA473Y
Q11 2SD635
Q12 2SA473Y
2SC945PK
Q7
RA1 3.9K×7
U3 MC14051BCP
U4 MC14528BCP
U8 μPA2003C
U9 MC14066BCP
U6 MC14051BCP
U7 CA3130E
U5 CA3740E
Q6 2SA733PK
P812
R8 1K
TP2
R51 50K
R50 50K
R49 50K
R35 50K
Q8 2SC945PK
TP1
TP3

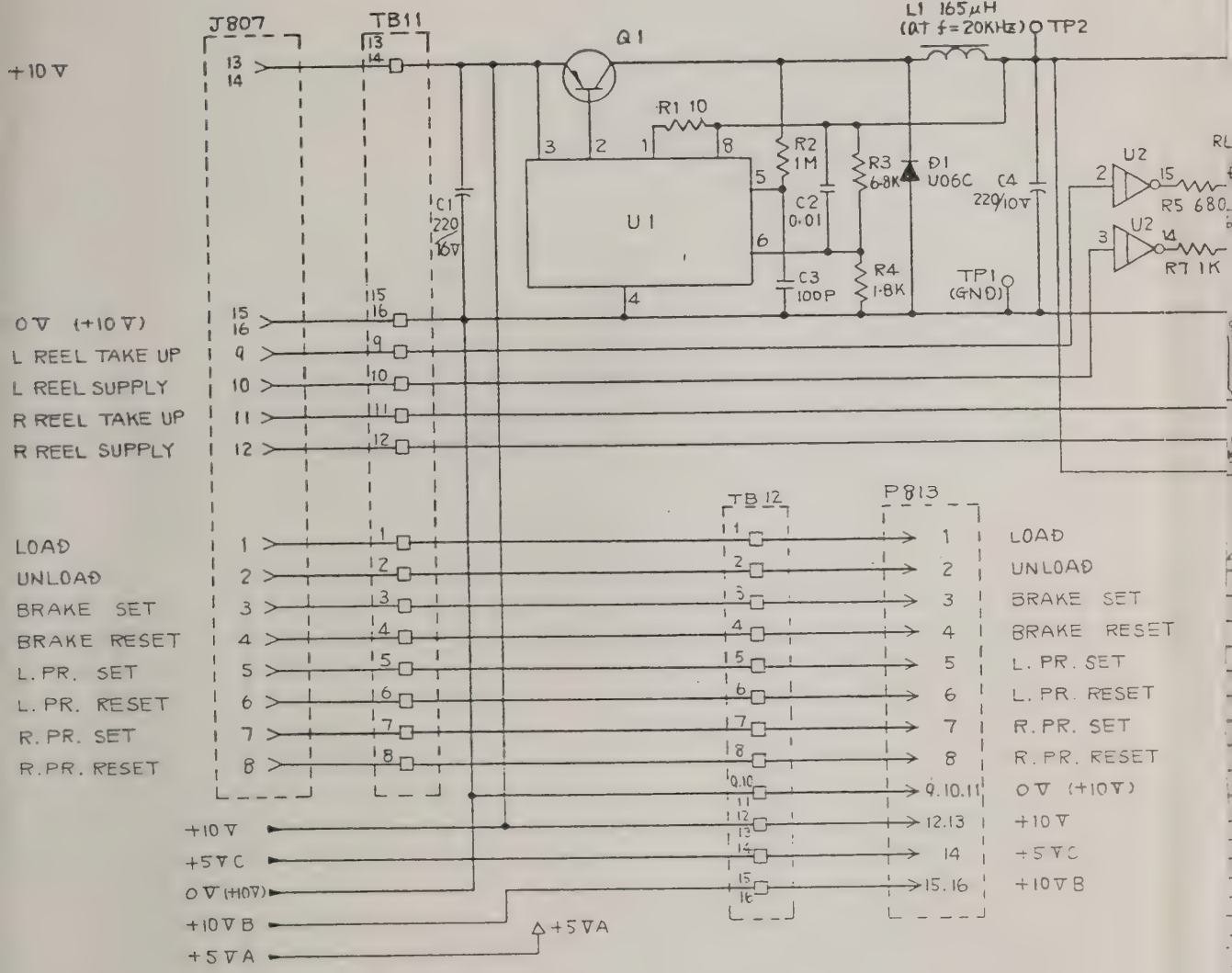
Parts marked with an * require longer delivery time.

EF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
		- IC's -		
, U6	13441441	MC 14051BCP	2	
	13447222	LM 305	1	
	13441388	MC 14528BCP	1	
, U8	13428107	u-PA2003C	2	
	13441399	MC 14066BCP	1	
	13447160	Linear CA3240E	1	
	13447191	Linear CA3130E	1	
		- Transistors -		
,10,12,	13421072	2SA473Y	4	
,4,6	13421089	2SA733P.K	3	
,11	13427094	2SD635	2	
,8,13	13424134	2SC945P.K	3	
,5	13423098	2SB553Y	2	
		- Diodes -		
	13411096	U06C	1	
, 5	13493992	Surge ubsorver 330V	2	
	14723302	Coil, 5V 3A	1	
A1	13492166	Resistor Array 4-element 3.9k 5%	1	
2,3,6,7, ,9,10	13413020	Diode 1S953	7	
		- Resistors -		
1	11193100	RD 1/4W 10 ohm 5%	1	
2	11193105	RD 1/4W 1M ohm 5%	1	
3	11037682	RN 1/4W 6.8k ohm 1%	1	
9, 16	11193151	RD 1/4W 150 ohm 5%	2	
46	11193472	RD 1/4W 4.7k ohm 5%	1	
4	11037182	RD 1/4W 1.8k ohm 1%	1	
19	11193473	RD 1/4W 47k ohm 5%	1	
20	11193682	RD 1/4W 6.8k ohm 5%	1	
21,24	11193133	RD 1/4W 13k ohm 5%	1	
10,17	11193822	RD 1/4W 8.2k ohm	2	
5,12	11193681	RD 1/4W 680 ohm 5%	2	
7,14	11193102	RD 1/4W 1k ohm 5%	2	
22,25	11193273	RD 1/4W 27k ohm 5%	2	
23,26	11193563	RD 1/4W 56k ohm 5%	2	

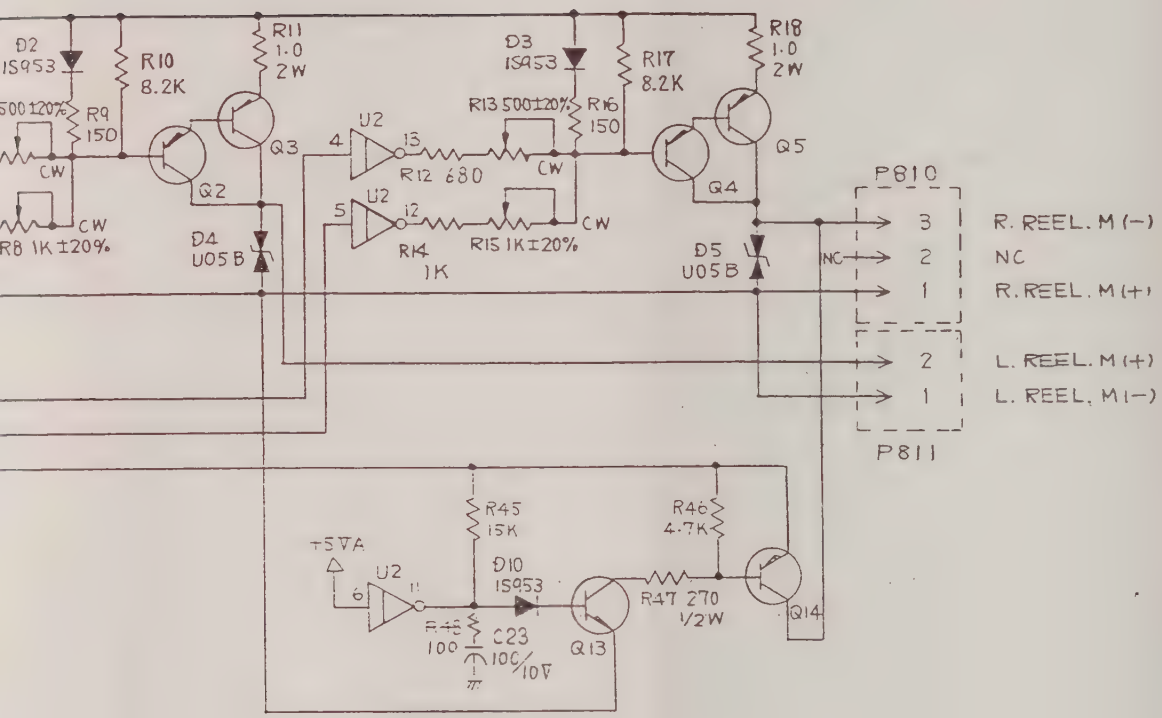
Parts marked with an • require longer delivery time.

F. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
		- Resistors -		
27	11193114	RD 1/4W 110k ohm 5%	1	
28	11193562	RD 1/4W 5.6k ohm 5%	1	
29,32	11193103	RD 1/4W 10k ohm 5%	2	
31,34	11193182	RD 1/4W 1.8k ohm 5%	2	
30,45	11193153	RD 1/4W 15k ohm 5%	2	
33	11193121	RD 1/4W 120 ohm 5%	1	
36	11193822	RD 1/4W 8.2k ohm 5%	1	
37	11193183	RD 1/4W 18k ohm 5%	1	
38,39	11193222	RD 1/4W 2.2k ohm 5%	1	
40,41	11193471	RD 1/4W 470 ohm 5%	2	
48	11193101	RD 1/4W 100 ohm 5%	1	
11,18	11200615	Cemented 2W 1 ohm 5%	2	
44	11200717	Cemented 3W 0.3 ohm 5%	1	
42,43	11195431	RD 1/2W 430 ohm	2	
47	11195271	RD 1/2W 270 ohm 5%	1	
		- Variable Resistors -		
6,13	13256674	VR 500 ohm ±20%	2	
8,15	13256675	VR 1k ohm ±20%	2	
		- Capacitors -		
4	12900796	CE 10V 220MF	1	
1	12900806	CE 16V 220MF	1	
13,14	12900792	CE 10V 22MF	2	
22	12900794	CE 10V 47MF	1	
2,9	12332103	CQ 50WV 0.01MF 5%	2	
6	12332472	CQ 50WV 0.0047MF 5%	1	
10	12332104	CQ 50WV 0.1MF 5%	1	
35,49, 0,51	13256680	Variable Resistors 50k ±20%	4	
		- Capacitors -		
3,12	12901558	CC 50V 100PF 2%	2	
5	12901614	CC 50V 180PF 5%	1	
8	12901650	CC 50V 470PF 10%	1	
15,16, 7,18, 9,20,21	12901626	CC 50V 0.01MF	7	
23	12900805	CE 16V 100MF	1	
11	12901462	CS 10V 10MF 10%	1	

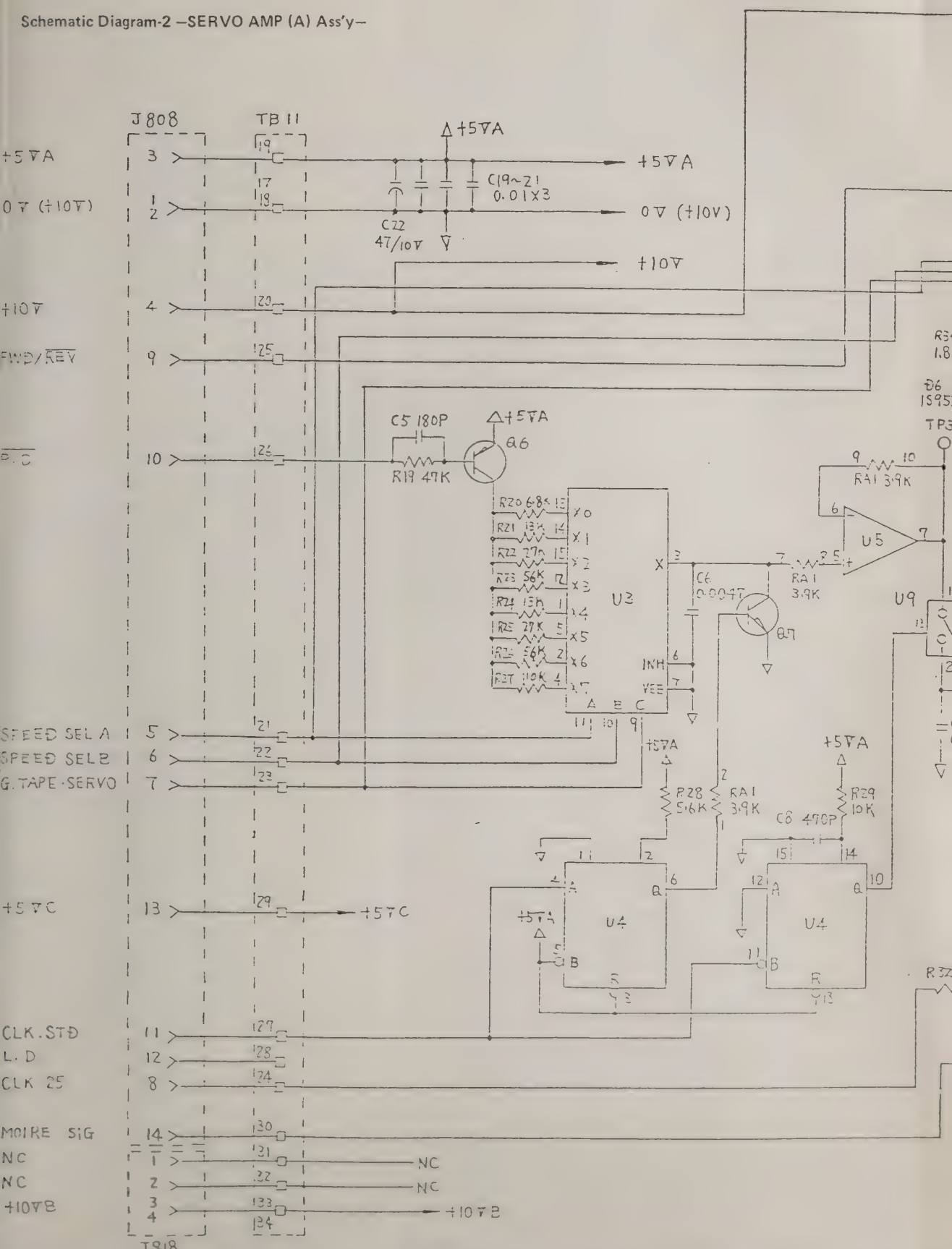
5-3-2 Schematic Diagram-1 –SERVO AMP (A) Ass'y–

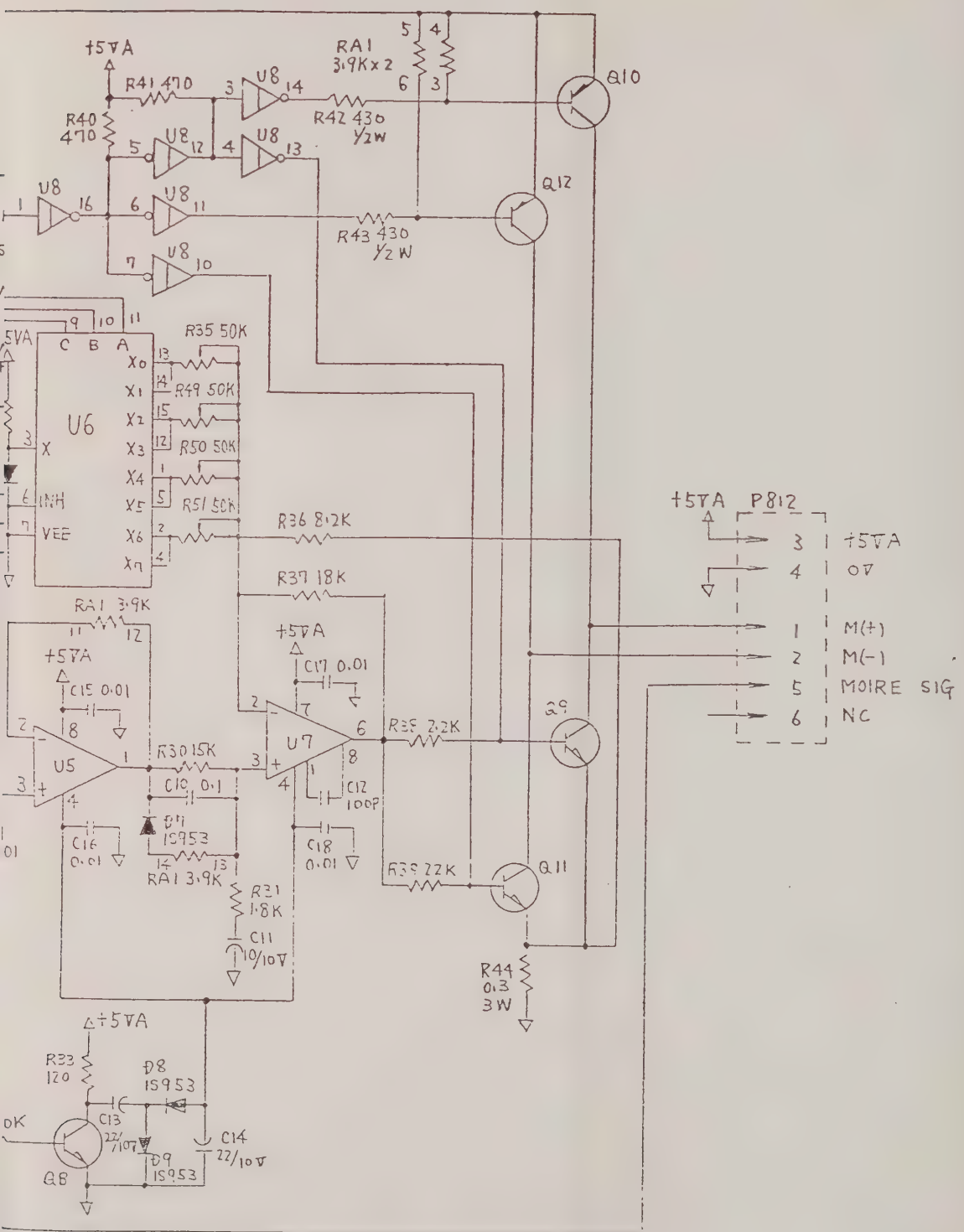


NOTE: UNLESS OTHERWISE SPECIFIED
ALL RESISTORS ARE IN OHMS, 1/4W ±5%,
AND ALL CAPACITORS ARE IN MICROFARADS.


D2
1S953
R10
8.2K
R11
1.0
2W
D3
1S953
R17
8.2K
R18
1.0
2W
R9
150
R13 500Ω±20%
R16
150
U2
Q3
Q2
Q4
Q5
CW
R12 680
R8 1K±20%
R14
1K
R15 1K±20%
D4
U05B
D5
U05B
P810
P811
3
2
1
NC
R. REEL. M(−)
NC
R. REEL. M(+)
L. REEL. M(+)
L. REEL. M(−)
+5VA
R45
15K
R46
4.7K
D10
1S953
R47 270
1/2W
Q13
Q14
C23
100/10V

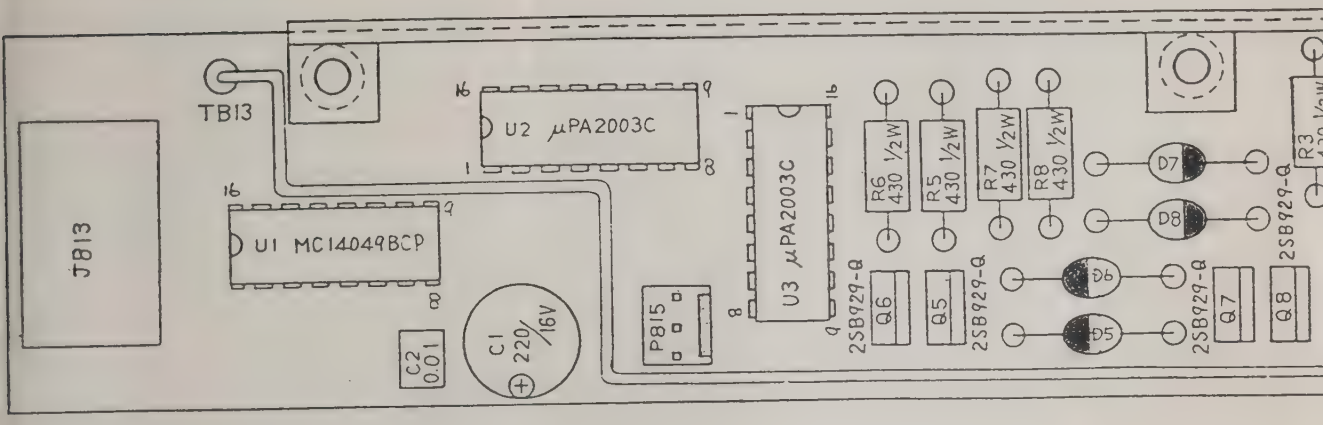
Schematic Diagram-2 –SERVO AMP (A) Ass'y–



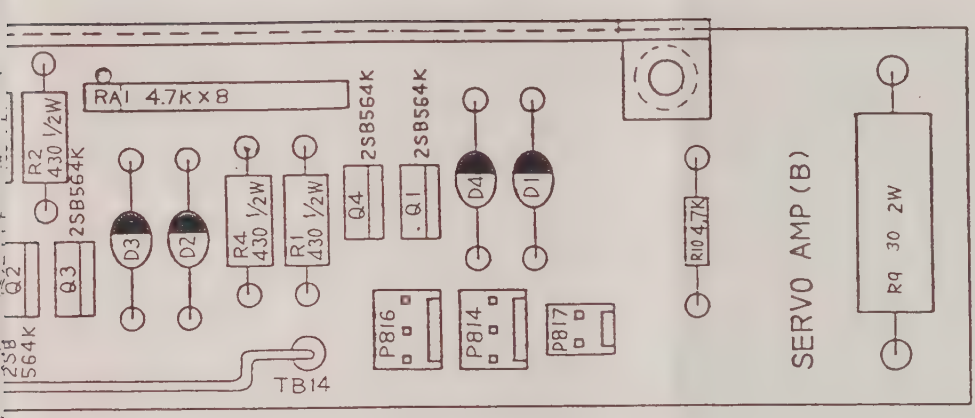


NOTE: UNLESS OTHERWISE SPECIFIED ALL RESISTURS ARE IN OHMS ¼W, ±5%,
RESISTOR ARRAY. IS IN OHMS. ⅛W ±5%
AND ALL CAPACITORS ARE IN MICROFARADS

5-3-3 SERVO AMP (B) Ass'y (15552282-00) and Parts List



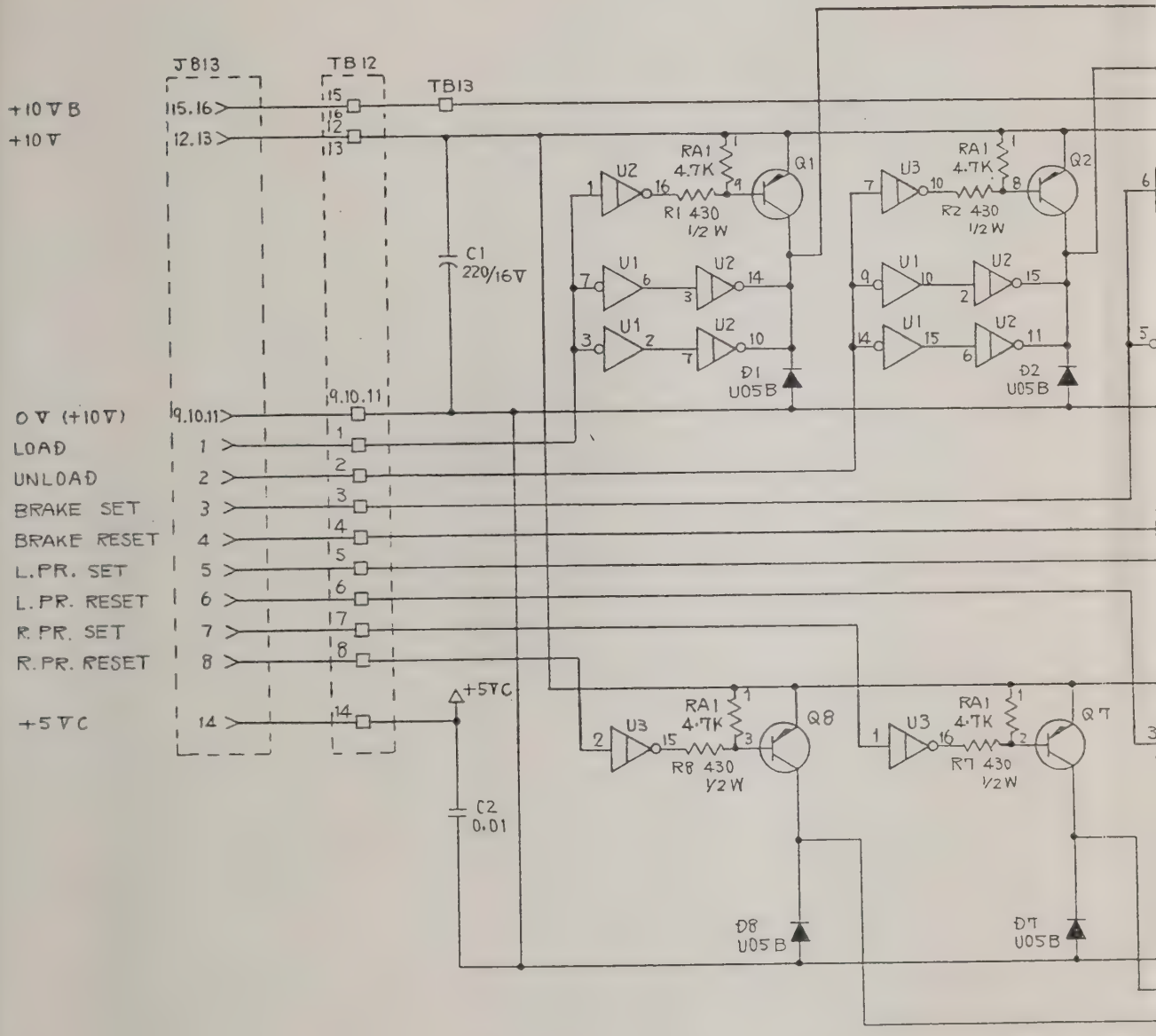
REF
U1
U2
Q1
Q5
D1
R1
R1
RA
R9
C1
C2
CN
CN
81



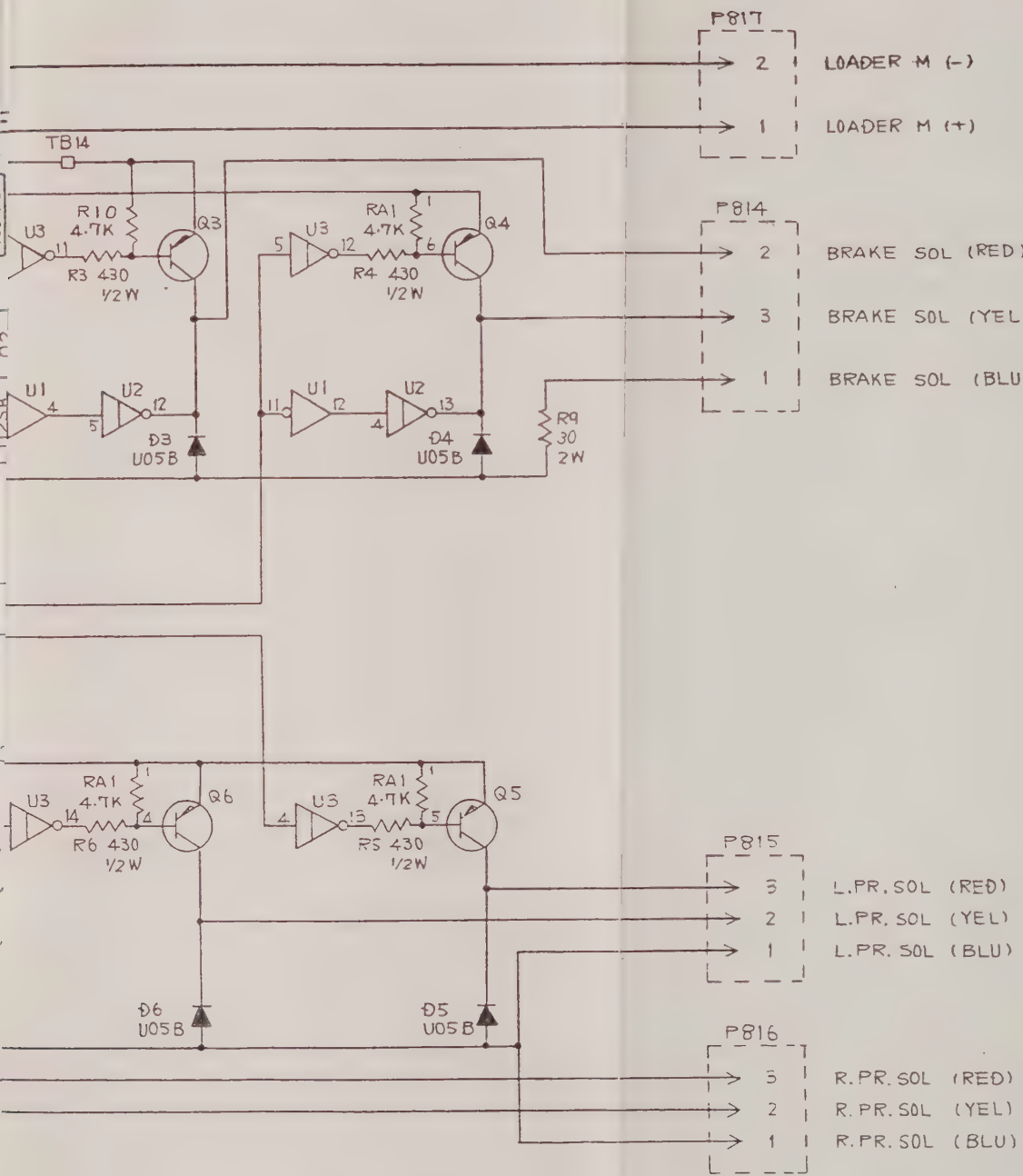
Parts marked with an * require longer delivery time.

NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
		- IC's -		
	13441383	MC 14049BCP	1	
3	13428107	u-PA2003C	2	
		- Transistors -		
~ Q4	13423101	2SB564K	4	
~ Q8	13423113	2SB929-Q	4	
~ D8	13411128	Diode 1S2455 (U05B)	8	
		- Resistors -		
)	11193472	RD 1/4W 4.7k ohm 5%	1	
~ R8	11195431	RD 1/2W 430 ohm	8	
	13492652	Array 8-element 4.7k ohm 5%	1	
	11200650	Cemented 2W 30 ohm 5%	1	
		- Capacitors -		
	12900806	CE 16V 220MF	1	
	12901626	CC 50V 0.01MF	1	
817J	13150589	Connector 2P	1	
814, 5,816	13150590	Connector 3P	3	

3-4 Schematic Diagram –SERVO AMP (B) Ass'y–



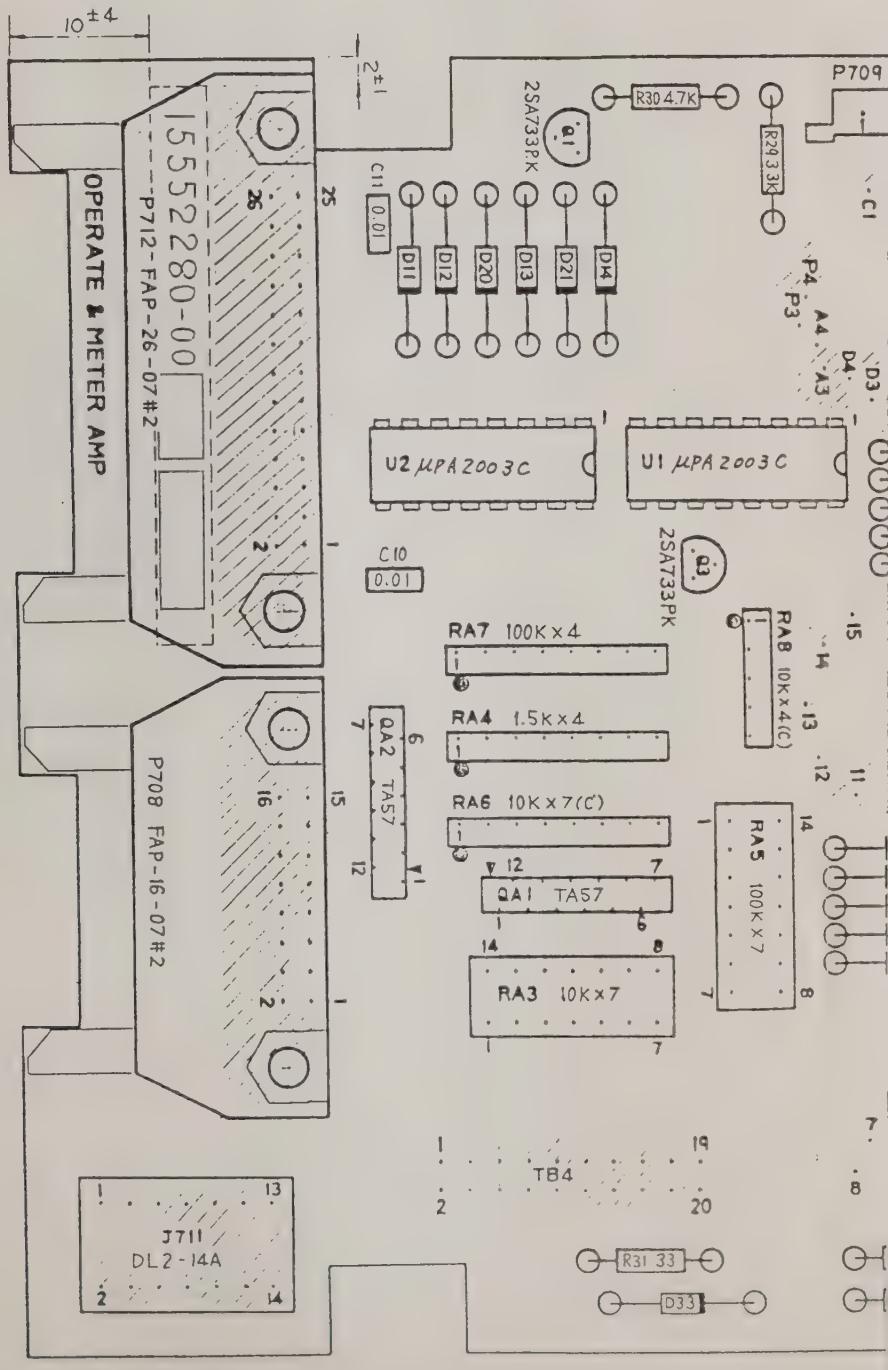
NOTE : UNLESS OTHERWISE SPECIFIED ALL RESISTORS
AND ALL CAPACITORS ARE IN MICROFARADS.



S ARE IN OHMS 1/4W. ±5%. RESISTOR ALLAY IS IN OHMS, 1/8W, ±5%

4 OPERATE & METER AMP ASS'Y

-4-1 PCBA (15552280-00)



HNC2-2.5P-8DS
P710
HNC2-2.5P-2DS
R9 11K (±1%)
C5 4.7/25V
R21 100K
D37
D35
R20 100K
R19 50K
R14 5K
R24 50K
R15 68K
D38
D39
D40
D41
D42
D43
R16 1K
R17 18K
R23 1M
R18 100K
L2 100μH
L1 100μH
C8 47/10V
C9 47/10V
C6 6P
U8 NJM 4560DX
U9 NJM 4560DX
U7 NJM 4560DX
R10 20K (±1%)
S13
C7 0.01
R22 1K
R11 33K
R25 1K
D32
D31
D28
D30
D29
R1 100K (±1%)
5.6K
R2
R3 22K
C4 1μ
BP
C7 47/35V
BP
R4 5.1K
U4 LF353N
U10 MC14053BCP
R33 100K (±1%)
R13 20K (±1%)
R12 33K (±1%)
R5 20K (±1%)
R6 20K (±1%)
R32 100K
D36
R8 56K
R7 560K
C1 2.2/50V
U5 LF353N
U6 LF353N
D19
D17
D16
D15
D18
D34
C2 2.2/50V
D27
D23
D24
D25
D26
D22
R26 330
S11
S12
S10
TB5
R27 4.7K
R28 3.3K
G2
2SA733P K
A2 A1 P1 P2
D1 D2
C2 C3 C4 C1

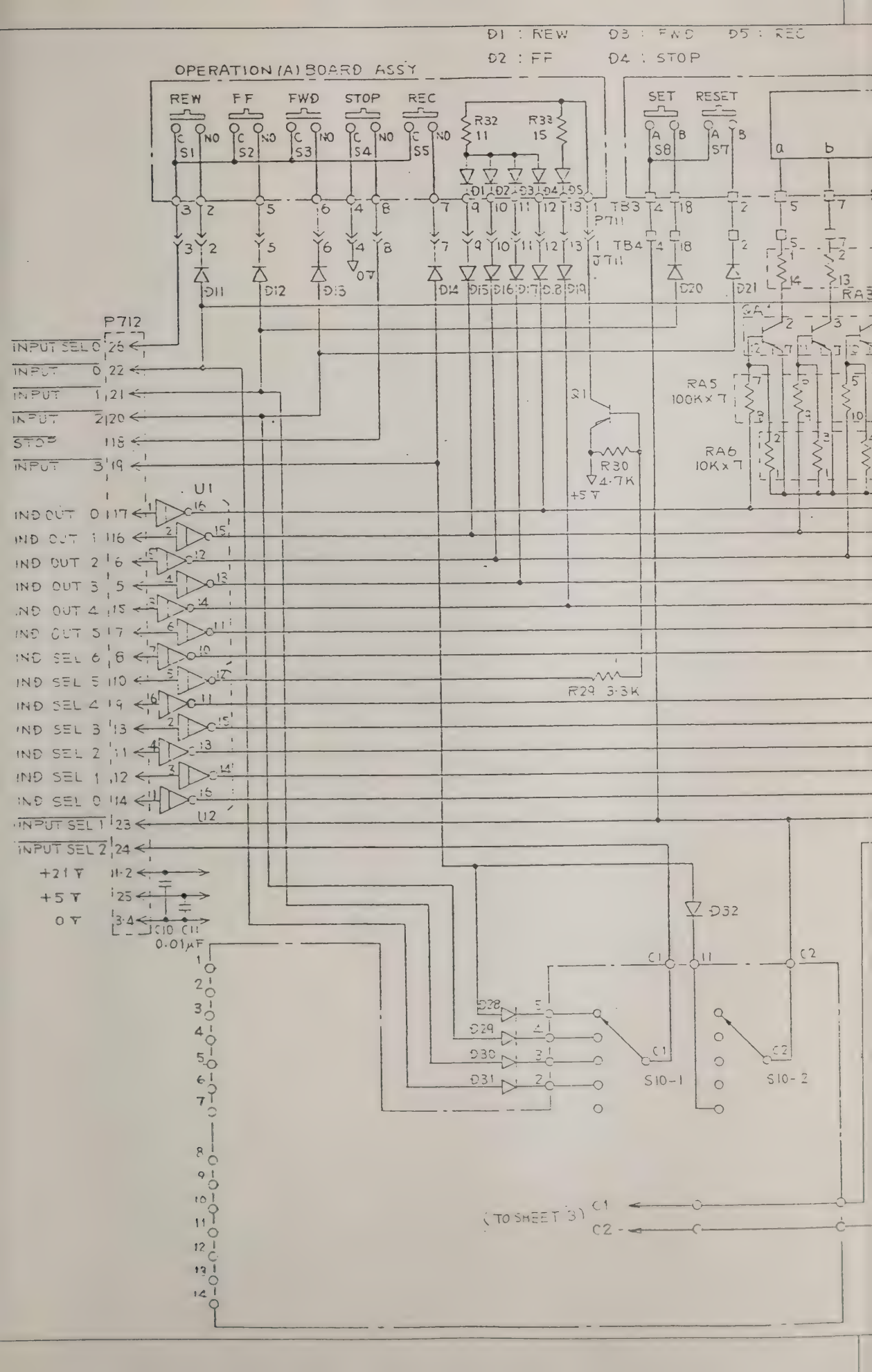
Parts marked with an * require longer delivery time.

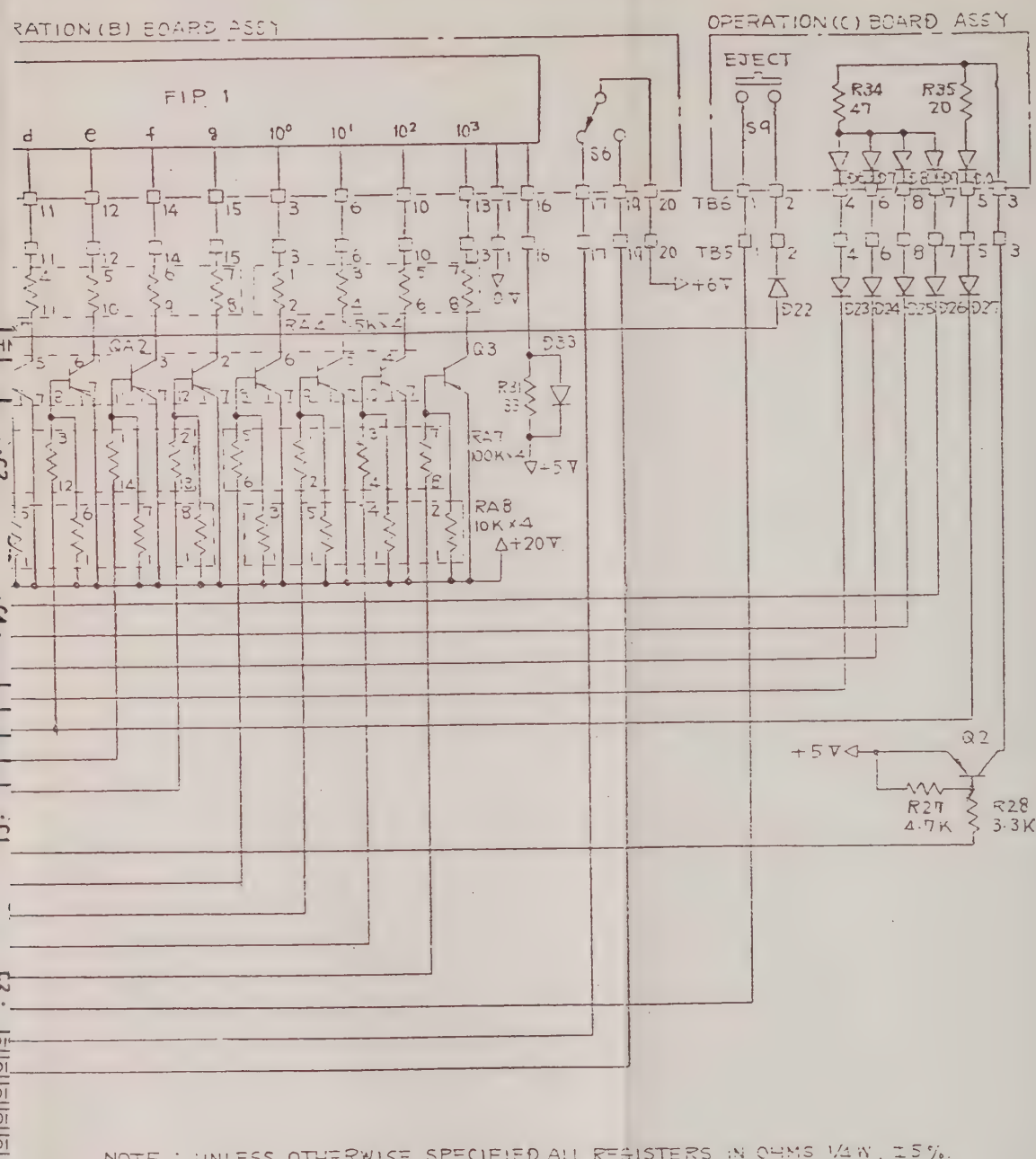
REF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
		- IC's -		
U7, U8,9	13447220	NJM4560-DD	3	
U1,U2	13428107	u-PA2003C	2	
U10	13441434	MC 14053BCP	1	
U4,U5,6	13447216	Linear LF353N	3	
		- Transistors -		
Q1,Q2,Q3	13421089	2SA733P.K	3	
QA1,QA2	13428103	Array TA57	2	
		- Diodes -		
D11~D32, D34~D43	13413020	1S953	32	
D33	13415163	Zener HZ4B2	1	
		- Resistors -		
R1,R33	11037104	RN 1/4W 100k ohm 1%	2	
R9	11037113	RN 1/4W 11k ohm 1%	1	
R5,6,10, 13	11037203	RN 1/4W 20k ohm 1%	4	
R12	11037333	RN 1/4W 33k ohm 1%	1	
R31	11193330	RD 1/4W 33 ohm 5%	1	
R26	11193331	RD 1/4W 330 ohm 5%	1	
R16,22, 25	11193102	RD 1/4W 1k ohm 5%	3	
R27,30	11193472	RD 1/4W 4.7k ohm 5%	2	
R4	11193512	RD 1/4W 5.1k ohm 5%	1	
R2	11193562	RD 1/4W 5.6k ohm 5%	1	
R15	11193682	RD 1/4W 6.8k ohm 5%	1	
R17	11193183	RD 1/4W 18k ohm 5%	1	
R3	11193223	RD 1/4W 22k ohm 5%	1	
R11	11193333	RD 1/4W 33k ohm 5%	1	
R28,29	11193332	RD 1/4W 3.3k ohm 5%	2	
R18,32, 21	11193104	RD 1/4W 100k ohm 5%	3	
R7,R8	11193564	RD 1/4W 560k ohm 5%	2	
R23	11193105	RD 1/4W 1M ohm 5%	1	
		-Variable Resistors -		
R14	13256677	VR 5k ohm	1	
R24,19	13256680	VR 50k ohm	2	
R20	13256681	VR 100k ohm	1	

D1 : REW D3 : FWD D5 : REC

D2 : FF D4 : STOP

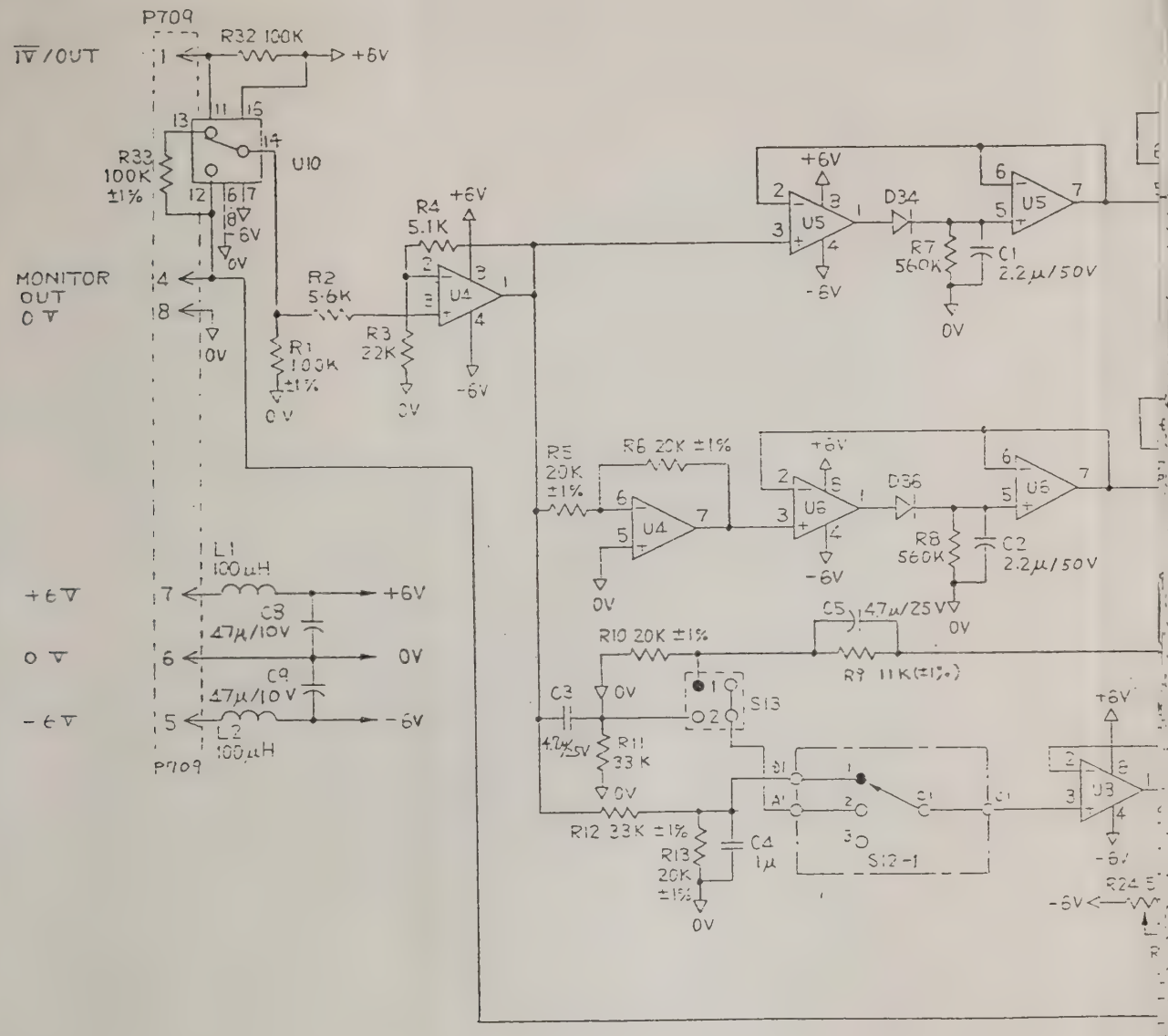
OPERATION (A) BOARD ASSY





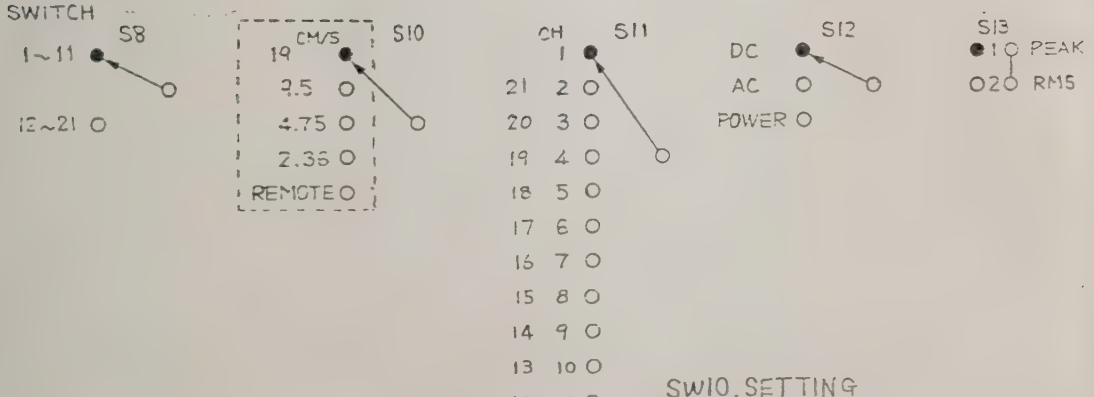
NOTE : UNLESS OTHERWISE SPECIFIED ALL REGISTERS IN OHMS 1/4 W, ±5%.

5-4-2 Schematic Diagram-1 –OPERATE & METER AMP Ass'y–



NOTE

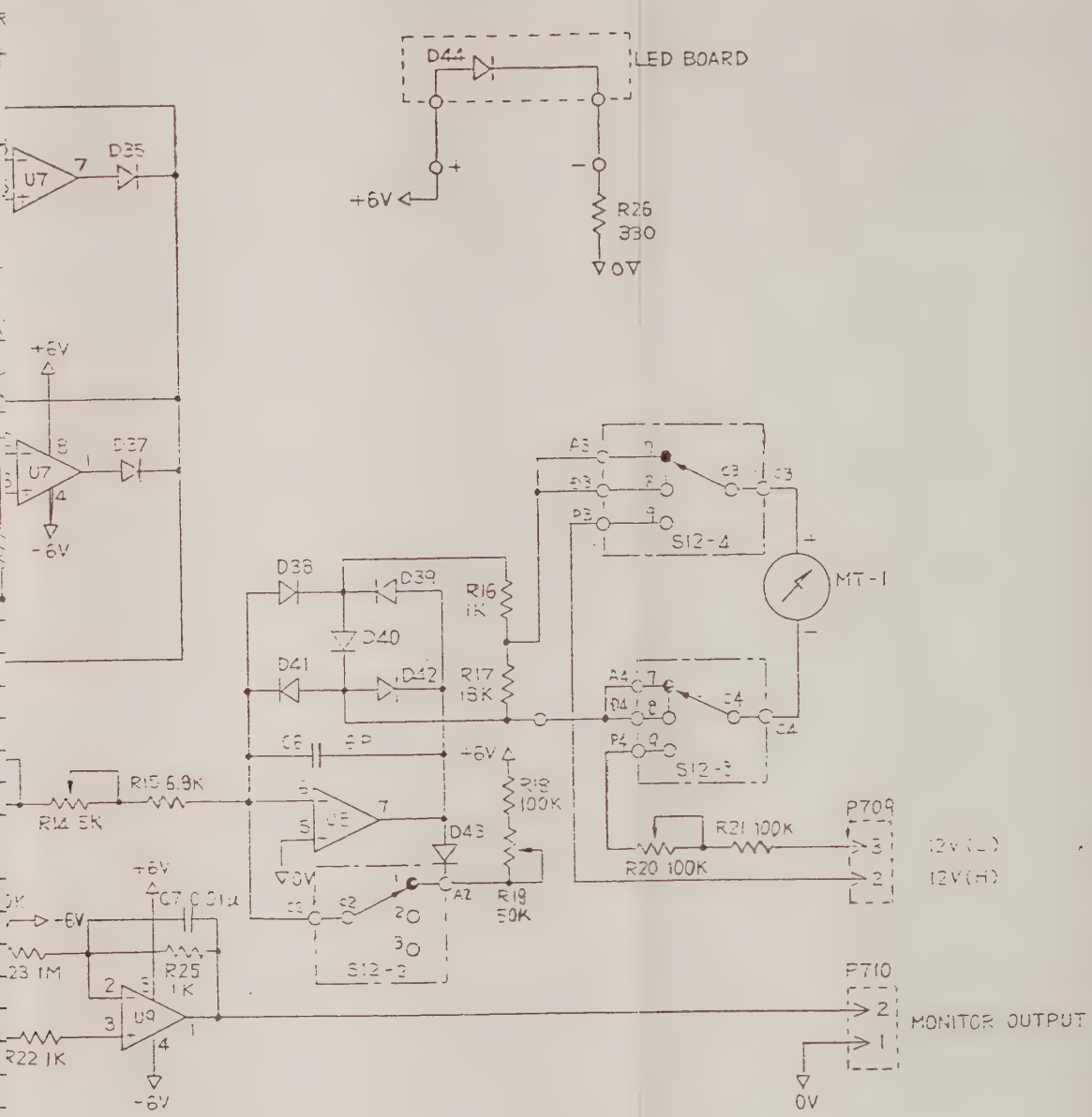
SWITCH



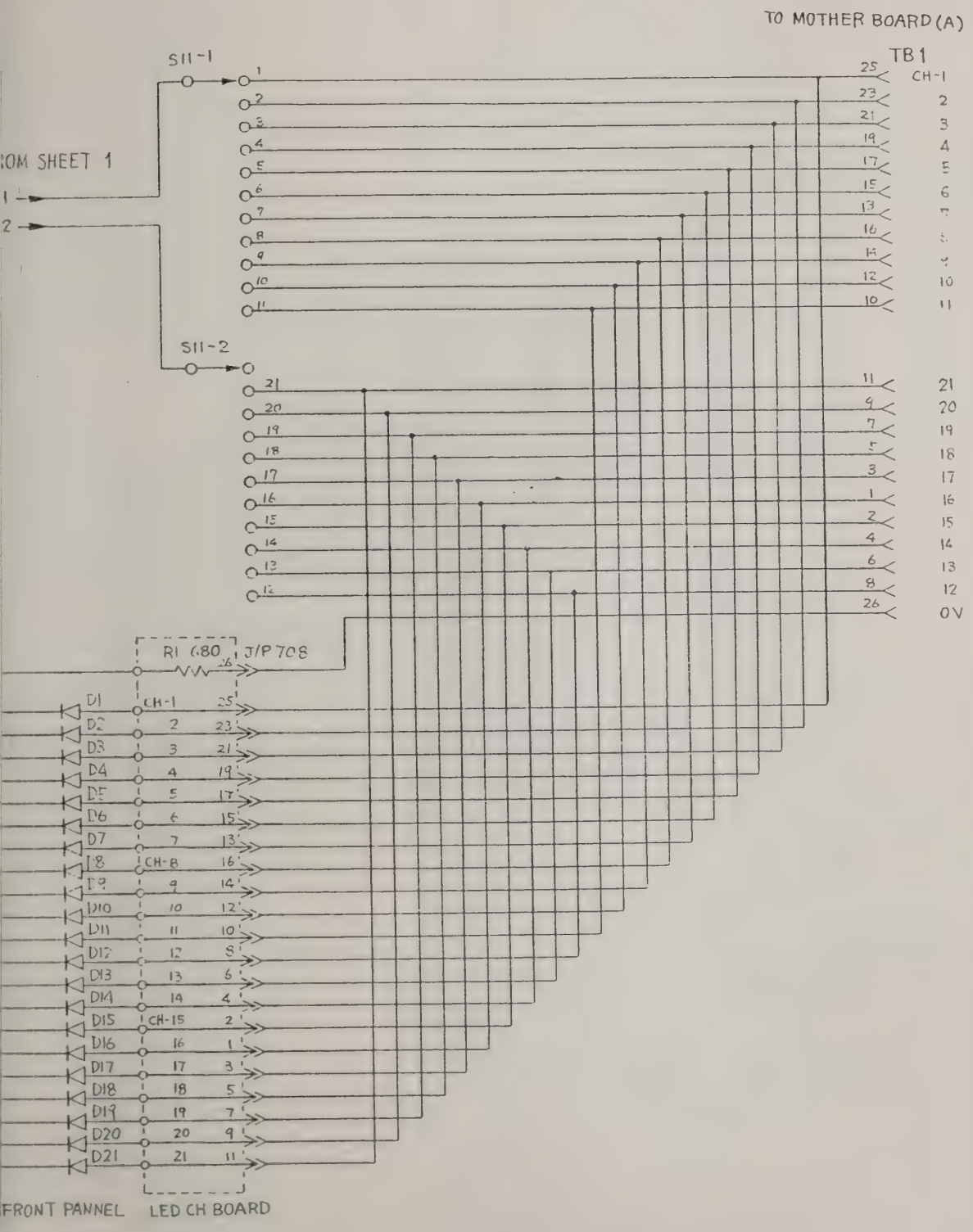
UNLESS OTHERWISE SPECIFIED ALL RESISTORS IN OHMS. 1/4W. ±5%. ALL CAPACITORS IN FARADS.

SW10 SETTING

LOW	STD	HIGH
9.5 CM/S	19 CM/S	38 CM/S
4.75	9.5	19
2.36	4.75	9.5
1.18	2.36	4.75
REMOTE	REMOTE	REMOTE

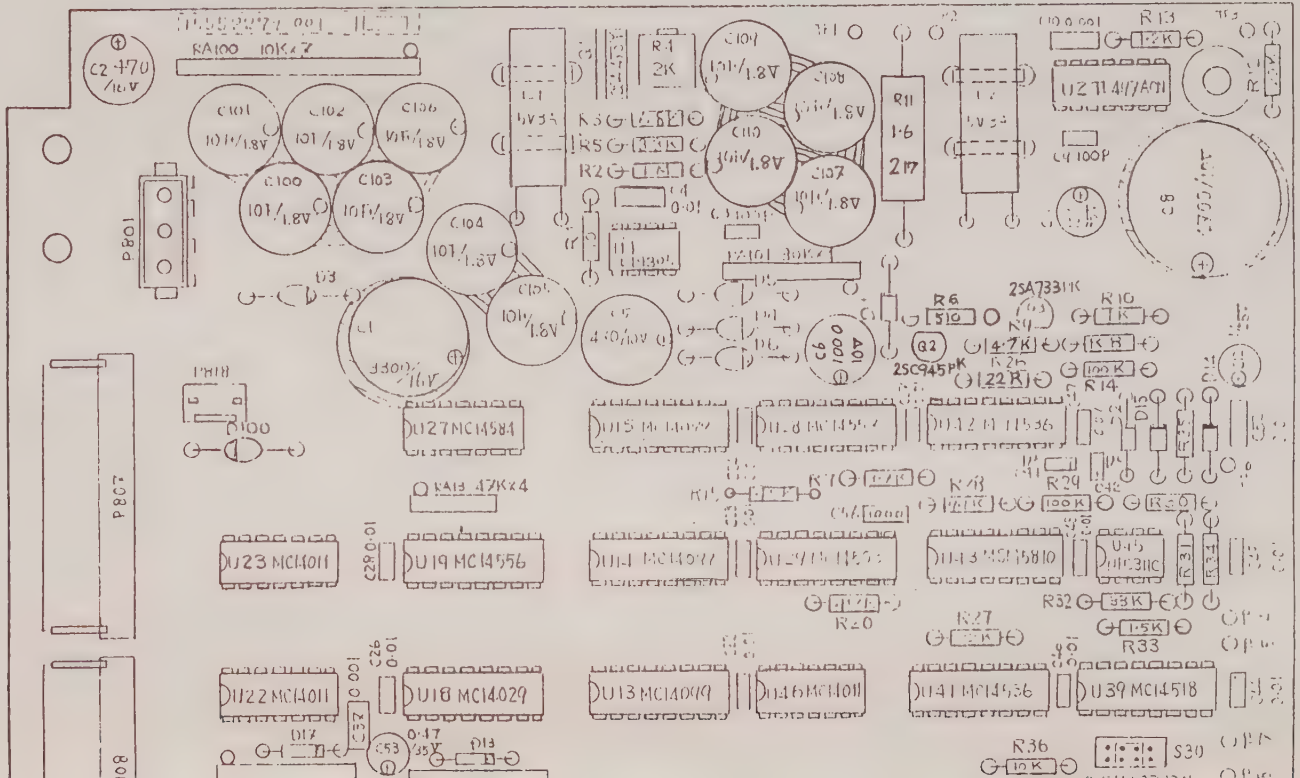


Schematic Diagram-2 —OPERATE & METER AMP Ass'y—


TO MOTHER BOARD (A)
TB1
CH-1
2
3
4
5
6
7
8
9
10
11
21
20
19
18
17
16
15
14
13
12
0V
SII-1
SII-2
OM SHEET 1
R1 680
J/P 708
D1
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
D12
D13
D14
D15
D16
D17
D18
D19
D20
D21
CH-8
CH-15
FRONT PANNEL
LED CH BOARD

CONTROL AMP ASS'Y

-1 PCBA (15552279-00)


RA100 10KX7
C2 470 /16V
C101 10U/1.8V
C102 10U/1.8V
C106 10U/1.8V
C100 10U/1.8V
C103 10U/1.8V
C104 10U/1.8V
C105 10U/1.8V
C1 470/10V
C3 470/10V
C4 0.01
C5 0.01
C107 10U/1.8V
C108 10U/1.8V
C109 10U/1.8V
C110 10U/1.8V
C111 10U/1.8V
C112 10U/1.8V
C113 10U/1.8V
C114 10U/1.8V
C115 10U/1.8V
C116 10U/1.8V
C117 10U/1.8V
C118 10U/1.8V
C119 10U/1.8V
C120 10U/1.8V
C121 10U/1.8V
C122 10U/1.8V
C123 10U/1.8V
C124 10U/1.8V
C125 10U/1.8V
C126 10U/1.8V

Parts marked with an • require longer delivery time.

EF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
		- IC's -		
	13447222	Linear LM305	1	
	13447221	Linear TL497ACN	1	
5	13447146	Linear u-PC 311C	1	
,U36	13441580	MC 14584BCP	2	
,U9,U10, 1,U12, 3,U14, 5	13441603	MC 14099BCP	8	
6,U47	13441236	SN74LS05N	2	
7	13441383	MC 14049BCP	1	
0	13441567	MC 6802P	1	
1	13700000-00	Memory	1	
2	13441231	SN 74LS00N	1	
3,U34	13441237	SN 74LS10N	2	
5	13441378	MC 14001BCP	1	
7	13441235	SN 74LS04N	1	
8	13441495	SN 74LS393N	1	
9	13441385	MC 14518BCP	1	
0	13441434	MC 14053BCP	1	
1,U42	13441509	MC 14536BCP	2	
4	13441403	MC 14077BCP	1	
3	13441581	MSM5810	1	
8	13441604	MC 14029BCP	1	
9	13441600	MC 14556BCP	1	
0	13441378	MC 14001BCP	1	
7	13441580	MC 14584BCP	1	
6, U22, 3	13441379	MC 14011BCP	3	
5	13441429	MC 14025BCP	1	
6,U29	13441490	MC 14503BCP	2	
8	13441601	MC 14557BCP	1	
		- Transistors -		
1	13421072	2SA473Y	1	
2,Q4,Q5	13424134	2SC945P.K	3	
3	13421089	2SA733P.K	1	

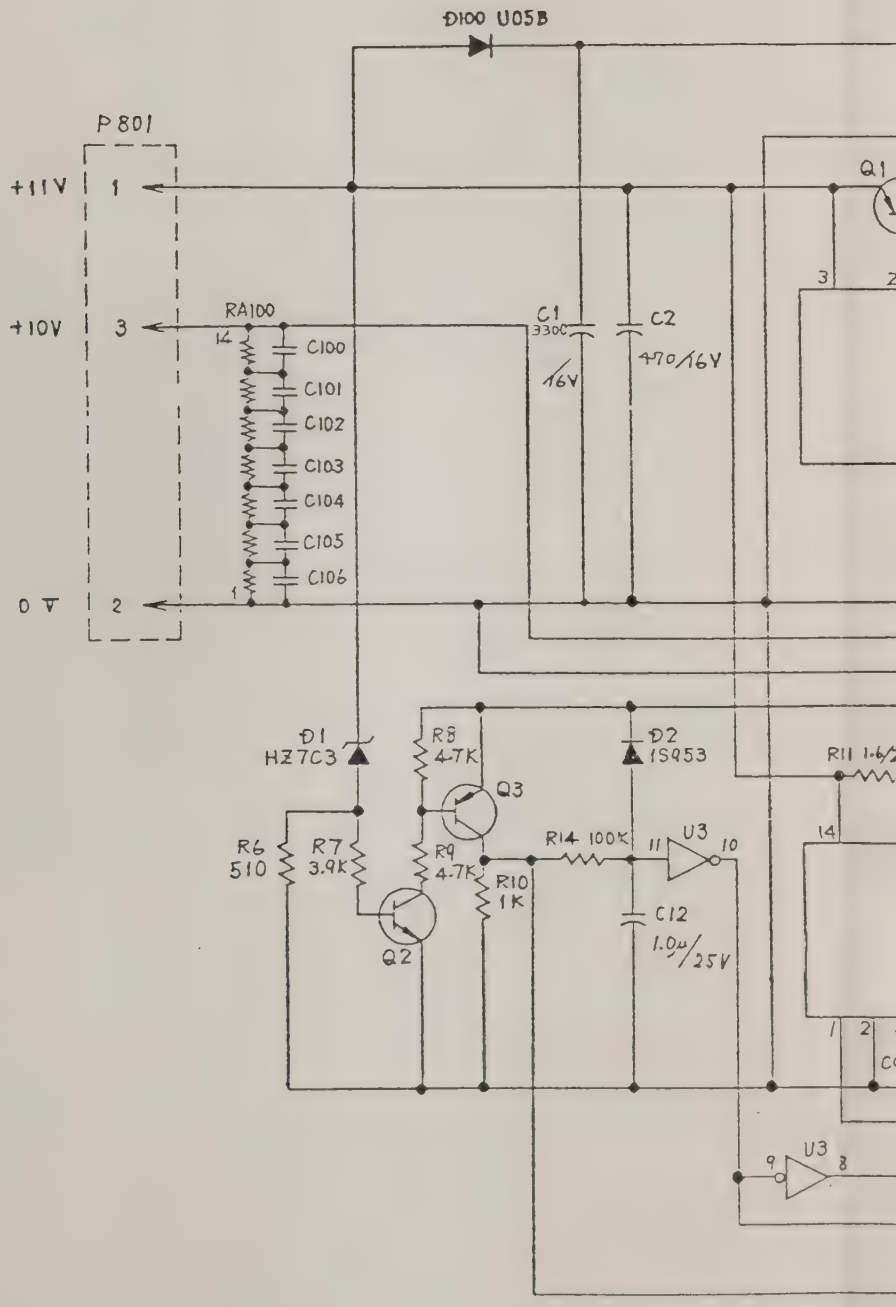
Parts marked with an * require longer delivery time.

F. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
		- Diodes -		
	13415191	Zener HZ7C3	1	
	13411096	U06C	1	
,D5,D6	13411194	W03C	3	
,7,8, 10,11, ,13,14, ,16,17	13413020	1S953	12	
100	13411128	1S2455 (U05B)	1	
		- Resistors -		
1	11193100	RD 1/4W 10 ohm 5%	1	
2	11193682	RD 1/4W 1M ohm 5%	1	
3	11193682	RD 1/4W 6.8k ohm 5%	1	
15,R18, 19,R20	11193473	RD 1/4W 47 ohm 5%	4	
5,R34	11193332	RD 1/4W 3.3k ohm 5%	2	
6	11193511	RD 1/4W 510 ohm 5%	1	
7	11193392	RD 1/4W 3.9k ohm 5%	1	
10,R25, 30	11193102	RD 1/4W 1k ohm 5%	3	
8,R9	11193472	RD 1/4W 4.7k ohm 5%	2	
13	11193122	RD 1/4W 1.2k ohm 5%	1	
14,R29	11193104	RD 1/4W 100k ohm 5%	1	
12	11193203	RD 1/4W 20k ohm 5%	1	
21,R22, 26,R27	11193223	RD 1/4W 22k ohm 5%	4	
16,R17, 36,R37	11193103	RD 1/4W 10k ohm 5%	4	
R23	11193561	RD 1/4W 560 ohm 5%	1	
R24	11193221	RD 1/4W 220 ohm 5%	1	
R28	11193912	RD 1/4W 9.1k ohm 5%	1	
R31	11193563	RD 1/4W 56k ohm 5%	1	
R32	11193333	RD 1/4W 33k ohm 5%	1	
R33	11193152	RD 1/4W 1.5k ohm 5%	1	
R35	11193394	RD 1/4W 390k ohm 5%	1	
R38	11193272	RD 1/4W 2.7k ohm 5%	1	
R11	11200620	Cemented 2W 1.6 ohm 5%	1	
R4	13256676	Variable Resistor 2k ohm ±20%	1	

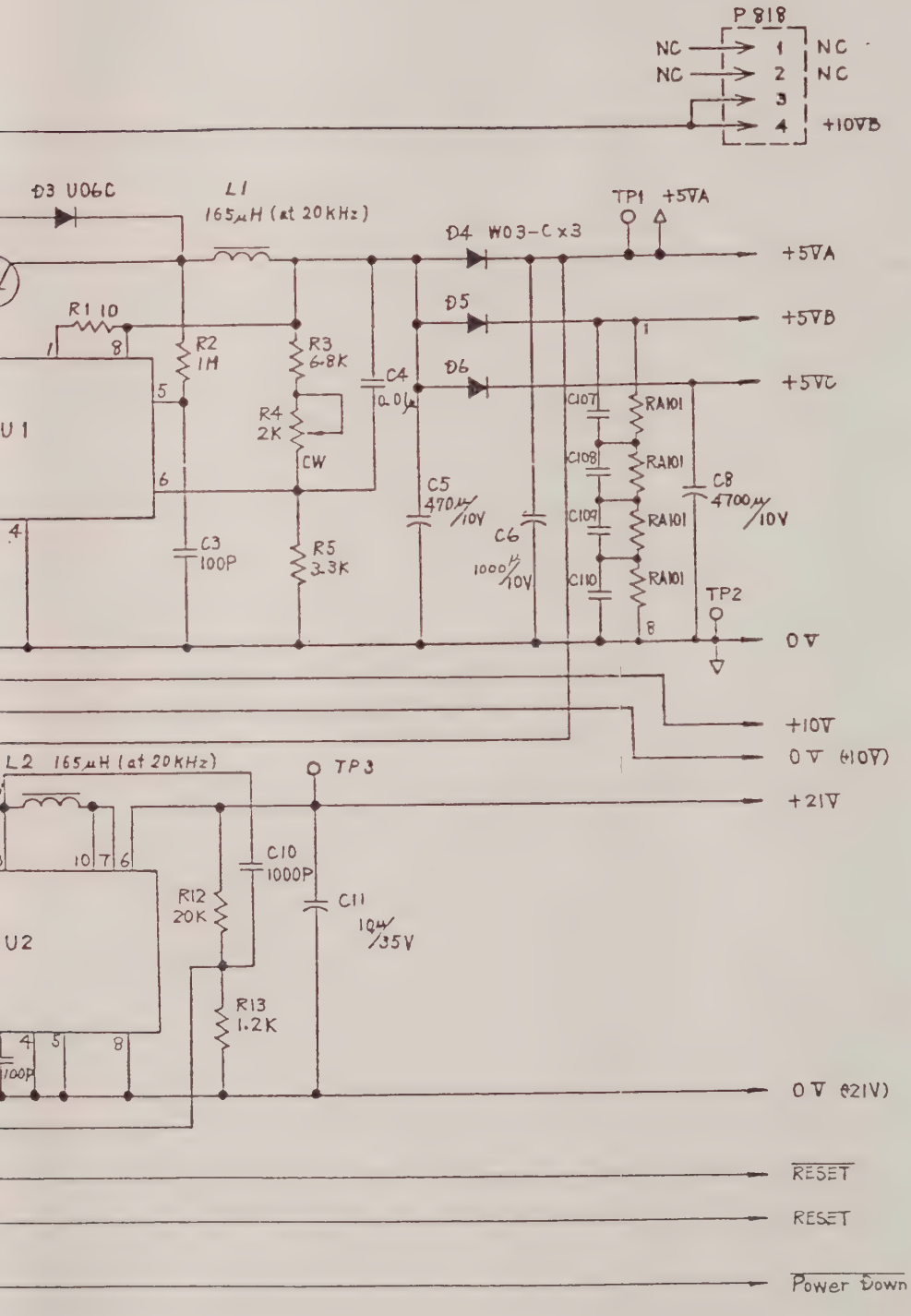
Parts marked with an * require longer delivery time.

F. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
		- Array Resistors -		
101	13491824	4-element 30k ohm 5%	1	
6,7,8, 10,11,	13492289	4-element 4.7k ohm 5%	7	
100	13492176	7-element 10k ohm 5%	1	
15,16	13491821	4-element 22k ohm 5%	2	
2,4,5,	13492297	4-element 10k ohm 5%	4	
1,3,13	13492313	4-element 47k ohm 5%	3	
, L2	14723302	Coil, 5V3A	2	
		- Capacitors -		
1	12082338	CE 16V 3300MF	1	
5	12900798	CE 10V 470MF	1	
2	12900808	CE 16V 470MF	1	
6	12900799	CE 10V 1000MF	1	
11	12900822	CE 35V 10MF	1	
3	12902017	CE 16V 4700MF	1	
10,C35 o 37, 56	12901781	CQ 100V 0.001MF	5	
3,C9	12901558	CC 50V 100PF 2%	2	
39,C40	12901550	CC 50V 22PF 2%	2	
13 to 8, C32 o 34, 8, C43 o 52	12901626	CC 50V 0.01MF	30	
4	12332103	CQ 50V 0.01MF 5%	1	
12,41, 2	12901483	CS 25V 1.0MF 10%	3	
29,C30, 1,53,54	12901495	CS 35V 0.47MF 10%	5	
100 to 110	12901926	Capacitor 1.8V 10F	11	
'tal	13295053	Crystal 3.2MHz	1	
TP1~8	13189145	Terminal TEST POINT	8	
P801	13105151	Connector 3P	1	
P802	13150597	Connector 10P	1	
P803	13151007	Connector 17P	1	
P804	13150610	Connector 12P	1	
P805	13150607	Connector 9P	1	

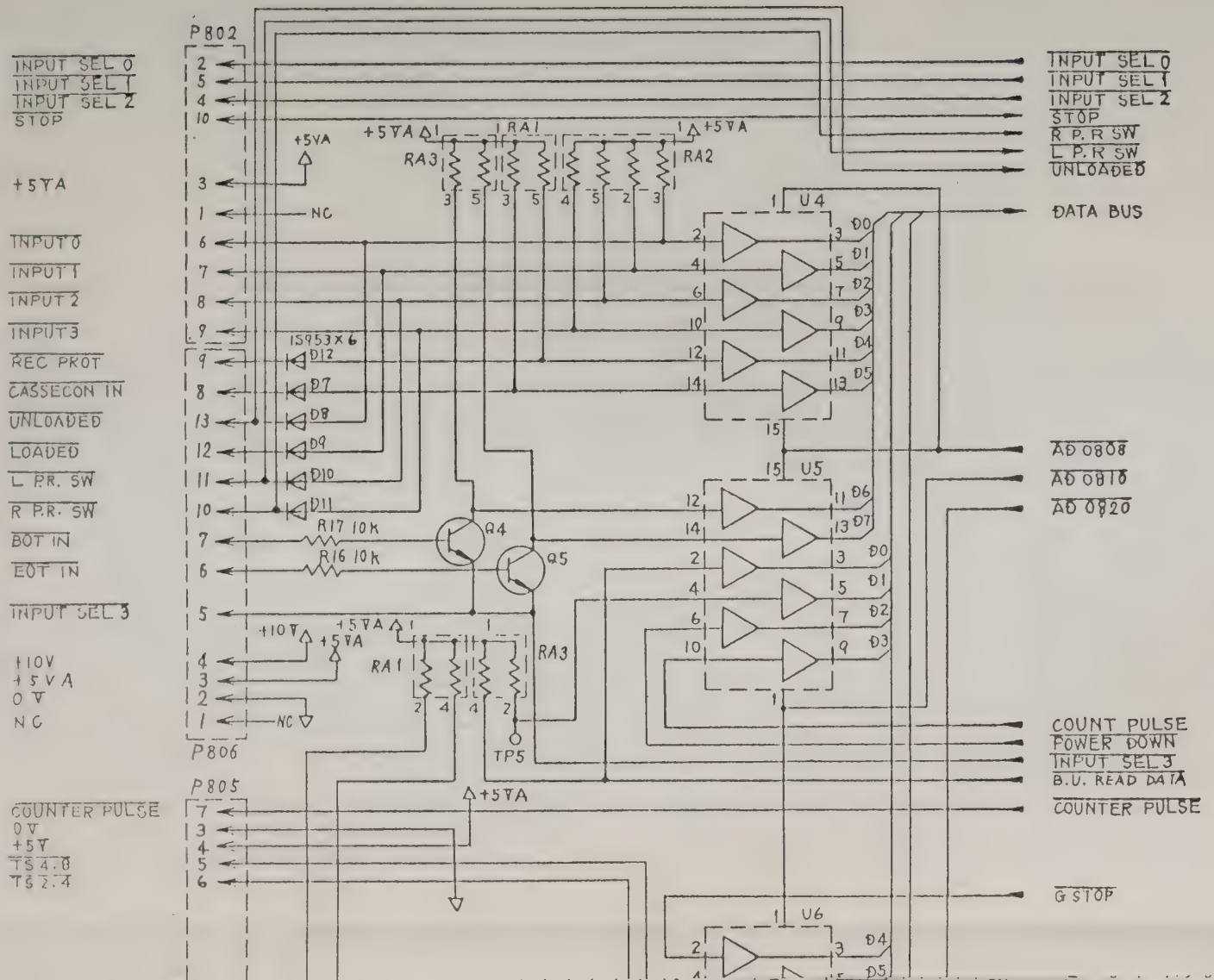
-5-2 Schematic Diagram-1 –CONTROL AMP Ass'y–

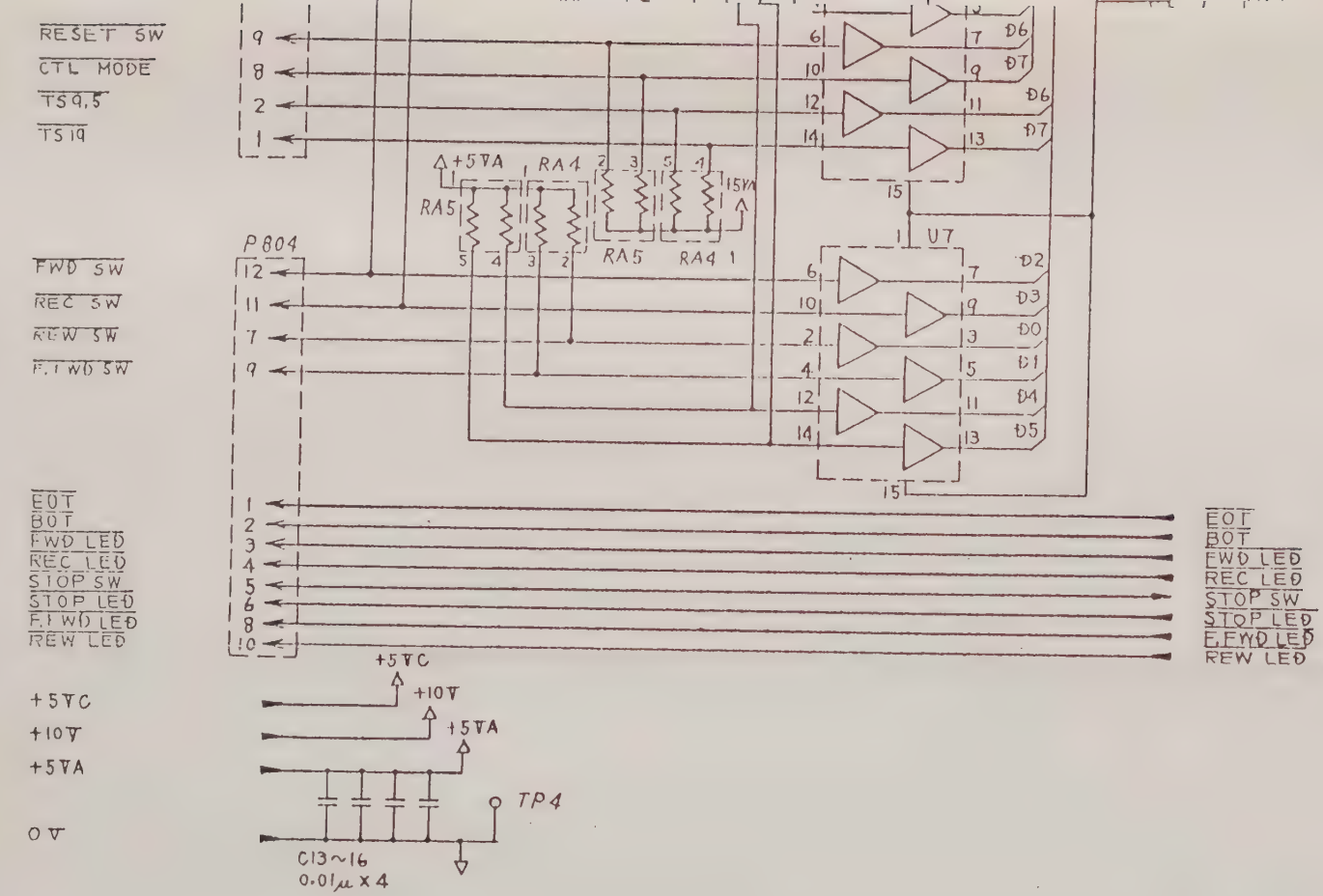


NOTE : UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE IN OHMS, 1/4W, ±5%. RESISTOR ALLAYS

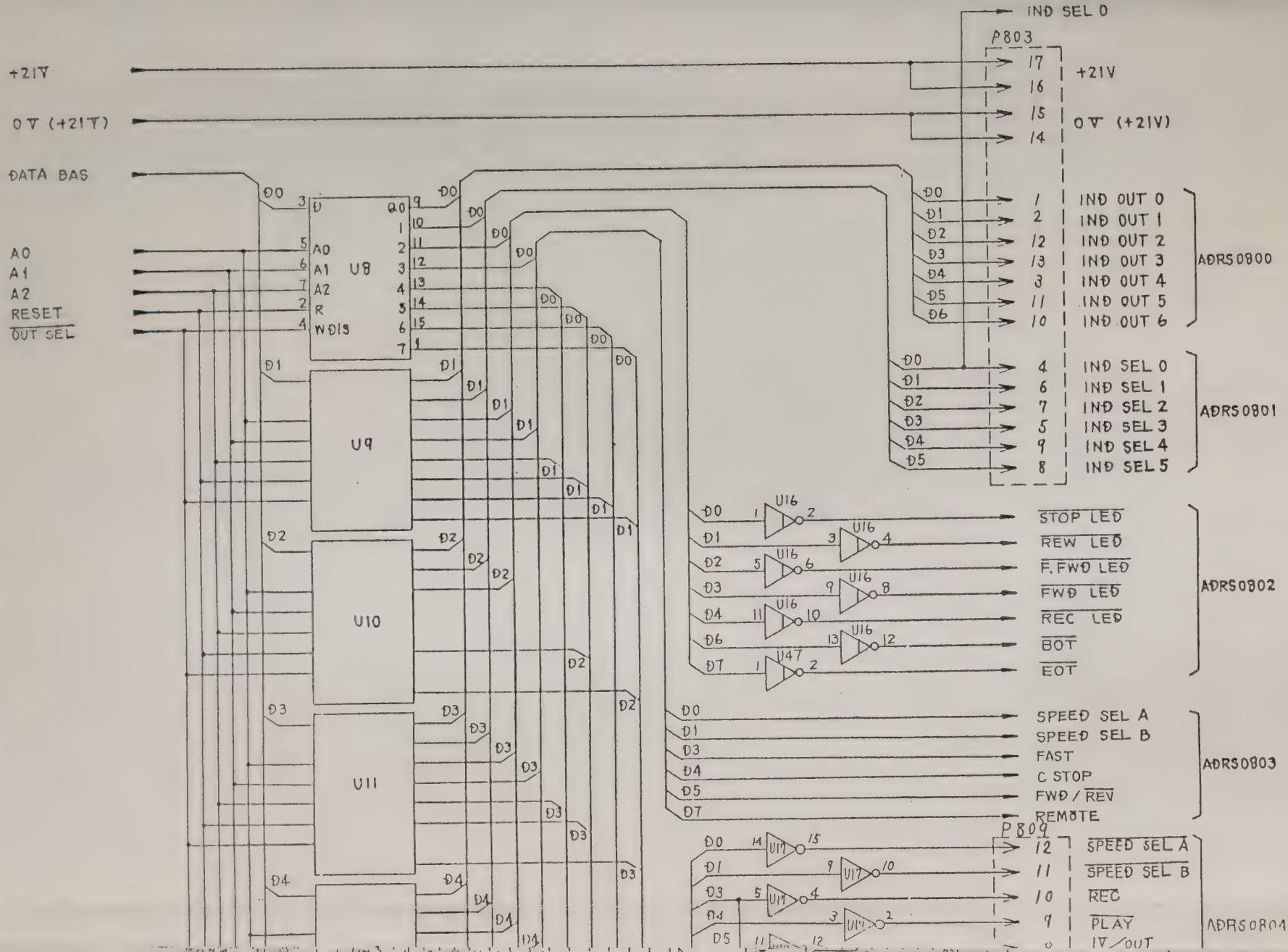


ARE IN OHMS 1/8W, ±5%, AND ALL CAPACITORS ARE IN FARADS.

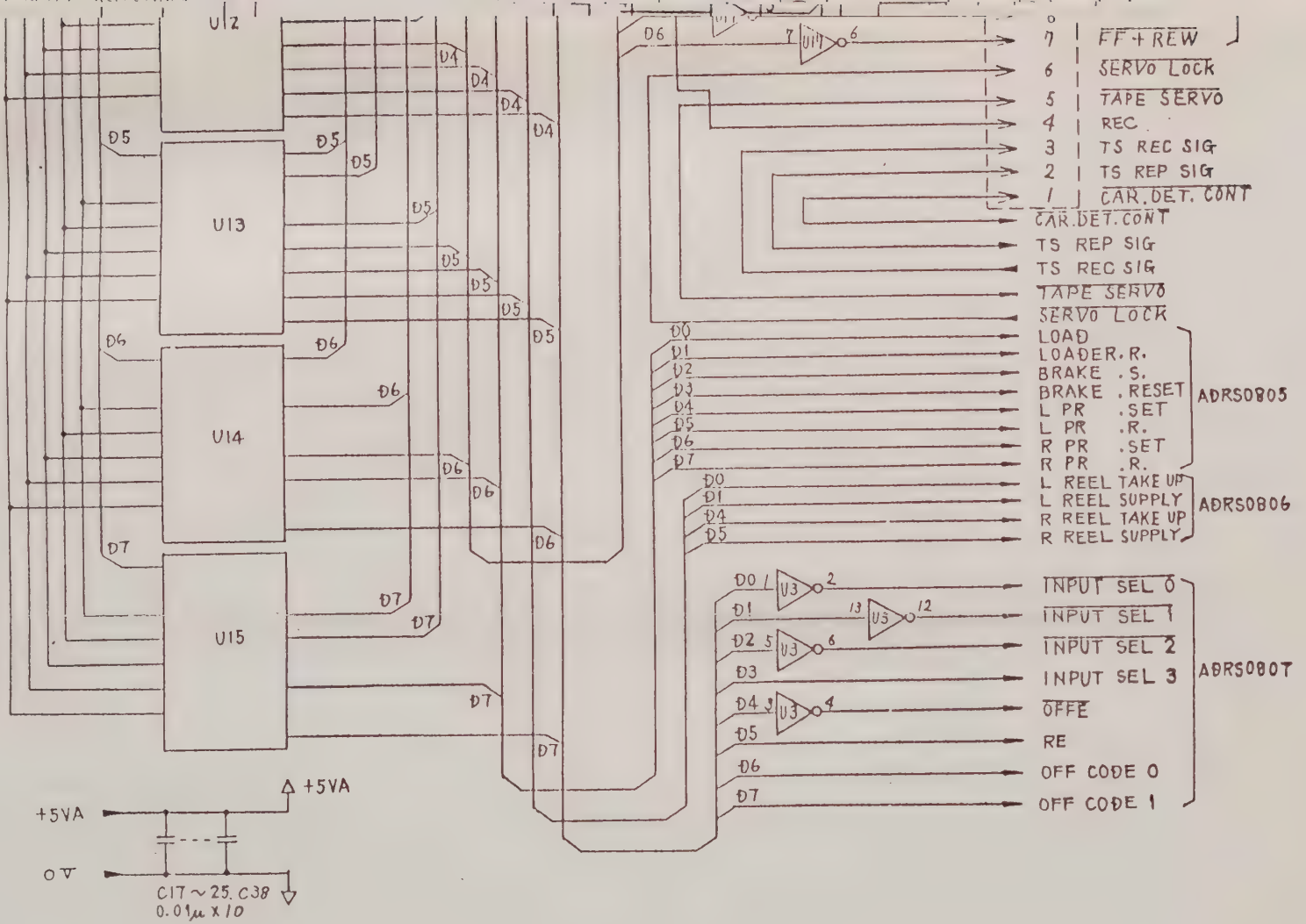

P802
INPUT SEL 0
INPUT SEL 1
INPUT SEL 2
STOP
+5VA
NC
INPUT 0
INPUT 1
INPUT 2
INPUT 3
REC PROT
CASSECON IN
UNLOADED
LOADED
L P.R. SW
R P.R. SW
BOT IN
EOT IN
INPUT SEL 3
+10V
+5VA
0V
NC
P806
P805
COUNTER PULSE
0V
+5V
TS4.8
TS2.4
RA1
RA2
RA3
IS953X6
D12
D7
D8
D9
D10
D11
R17 10K
R16 10K
Q4
Q5
TP5
U4
U5
U6
D0
D1
D2
D3
D4
D5
D6
D7
INPUT SEL 0
INPUT SEL 1
INPUT SEL 2
STOP
R P.R SW
L P.R SW
UNLOADED
DATA BUS
AD 0808
AD 0810
AD 0820
COUNT PULSE
POWER DOWN
INPUT SEL 3
B.U. READ DATA
COUNTER PULSE
G STOP



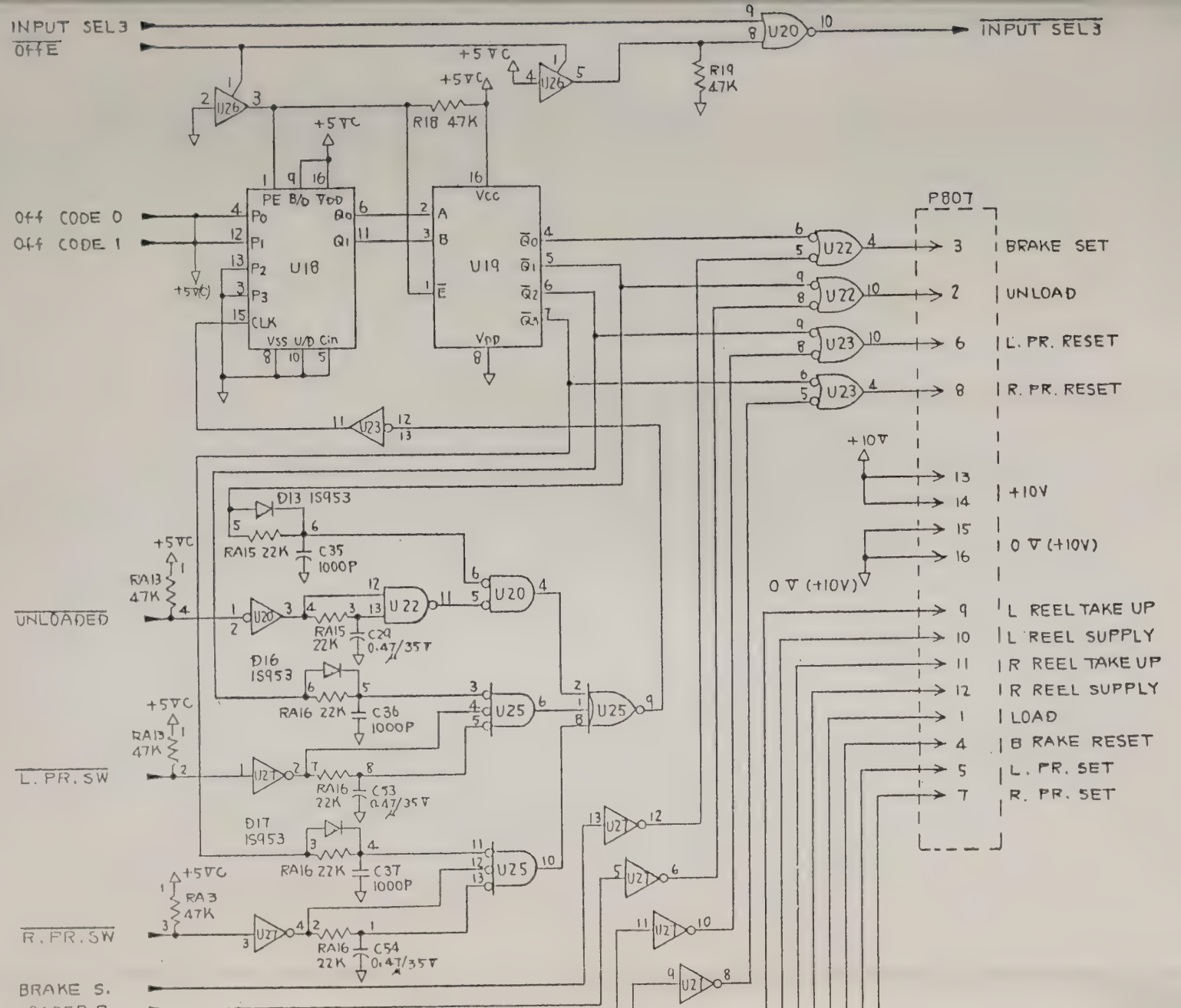
NOTE: UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE IN OHMS, 1/4W, ±5%. RESISTOR ALLAYS ARE IN OHMS 1/8W, ±5%, AND ALL CAPACITORS ARE IN FARADS.

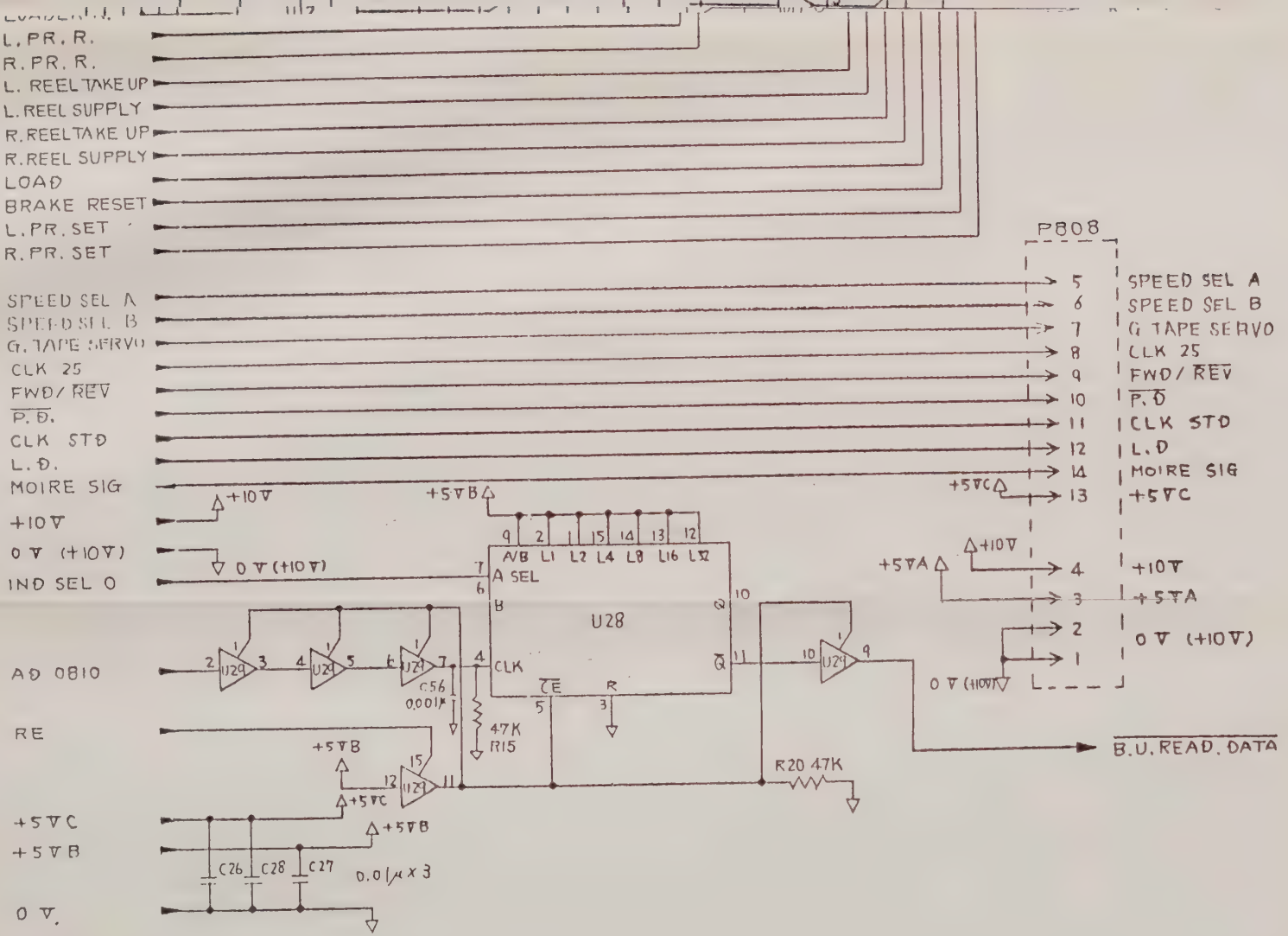


Schematic Diagram-3 –CONTROL AMP Ass'y–



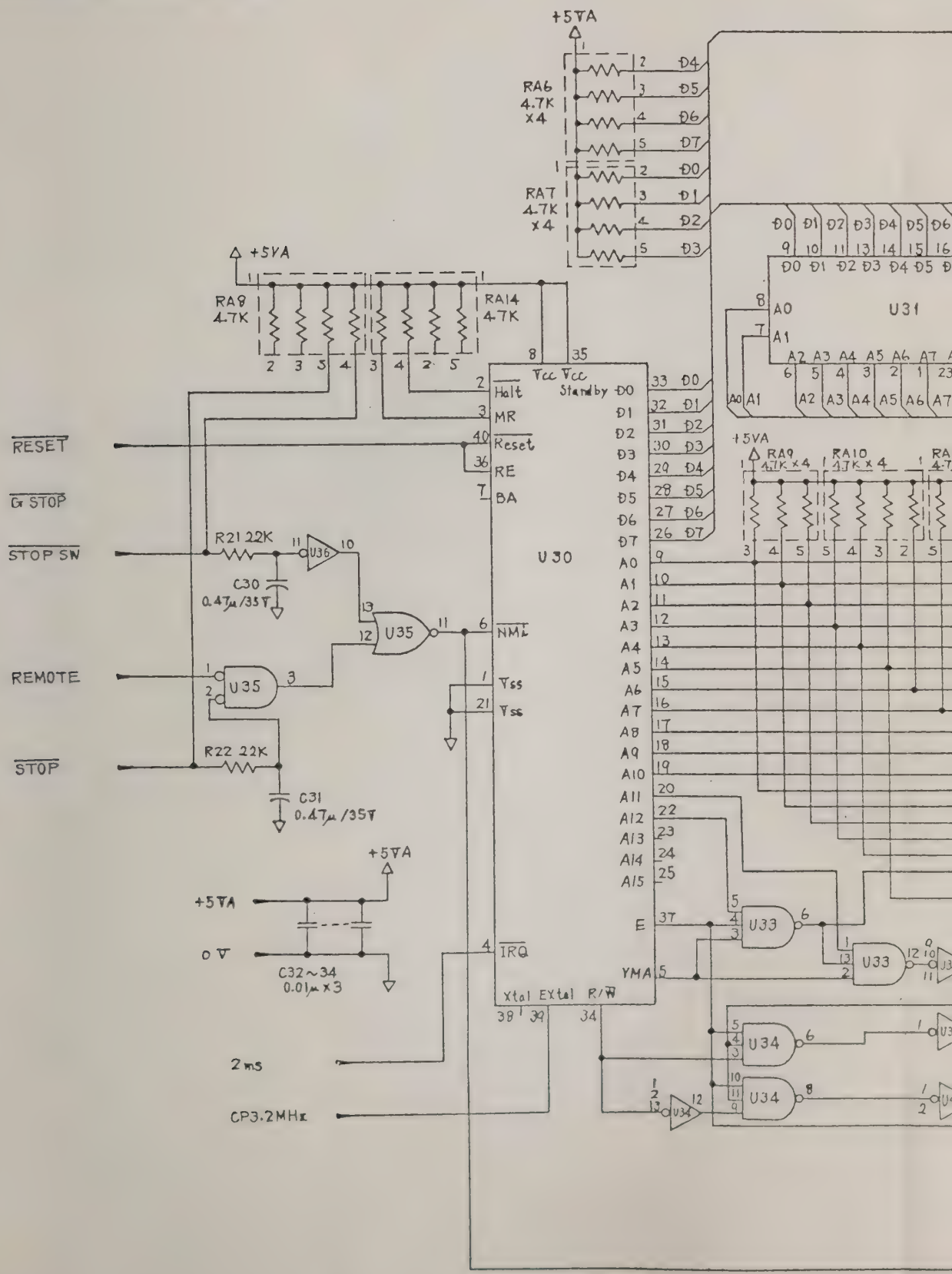
NOTE : UNLESS OTHERWISE SPECIFIED, ALL CAPACITORS ARE IN FARADS.

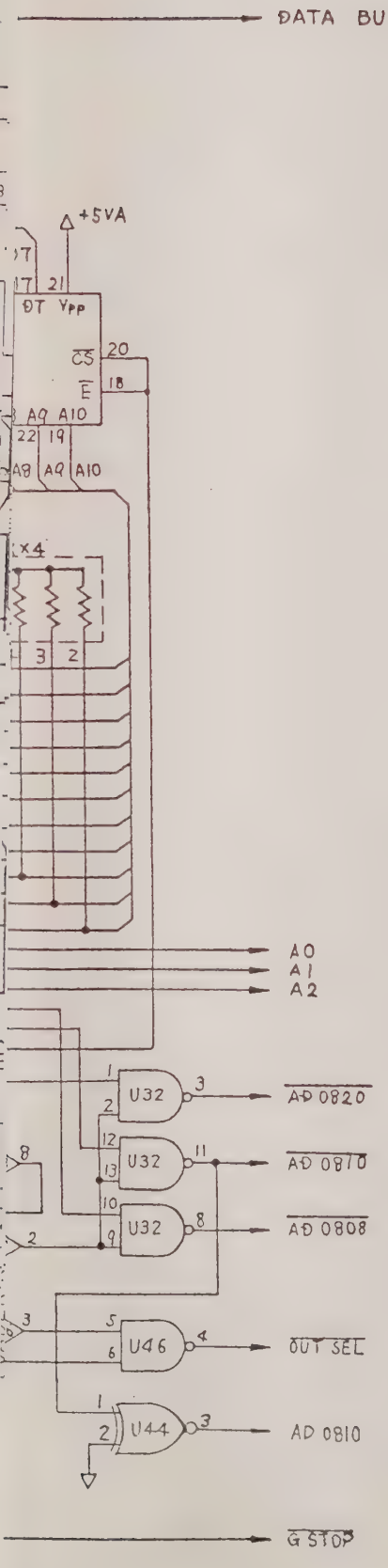

INPUT SEL3
OFFE
INPUT SEL3
U20
+5VC
U26
R19 47K
R18 47K
Off CODE 0
Off CODE 1
U18
U19
PE B/D VDD
Vcc
Vss U/D Cin
Vpp
U23
P807
BRAKE SET
UNLOAD
L. PR. RESET
R. PR. RESET
+10V
0 V (+10V)
L REEL TAKE UP
L REEL SUPPLY
R REEL TAKE UP
R REEL SUPPLY
LOAD
B RAKE RESET
L. PR. SET
R. PR. SET
D13 1S953
RA15 22K
C35 1000P
RA13 47K
UNLOADED
U22
C29 0.47/35V
D16 1S953
RA16 22K
C36 1000P
U25
L. PR. SW
U27
C53 0.47/35V
D17 1S953
C37 1000P
RA3 47K
R. PR. SW
C54 0.47/35V
BRAKE S.



NOTE : UNLESS OTHERWISE SPECIFIED. ALL RESISTORS ARE IN OHMS. 1/4W. ±5%. RESISTOR ALLAYS ARE IN OHMS 1/8W. ±5%. AND ALL CAPACITORS ARE IN FARADS.

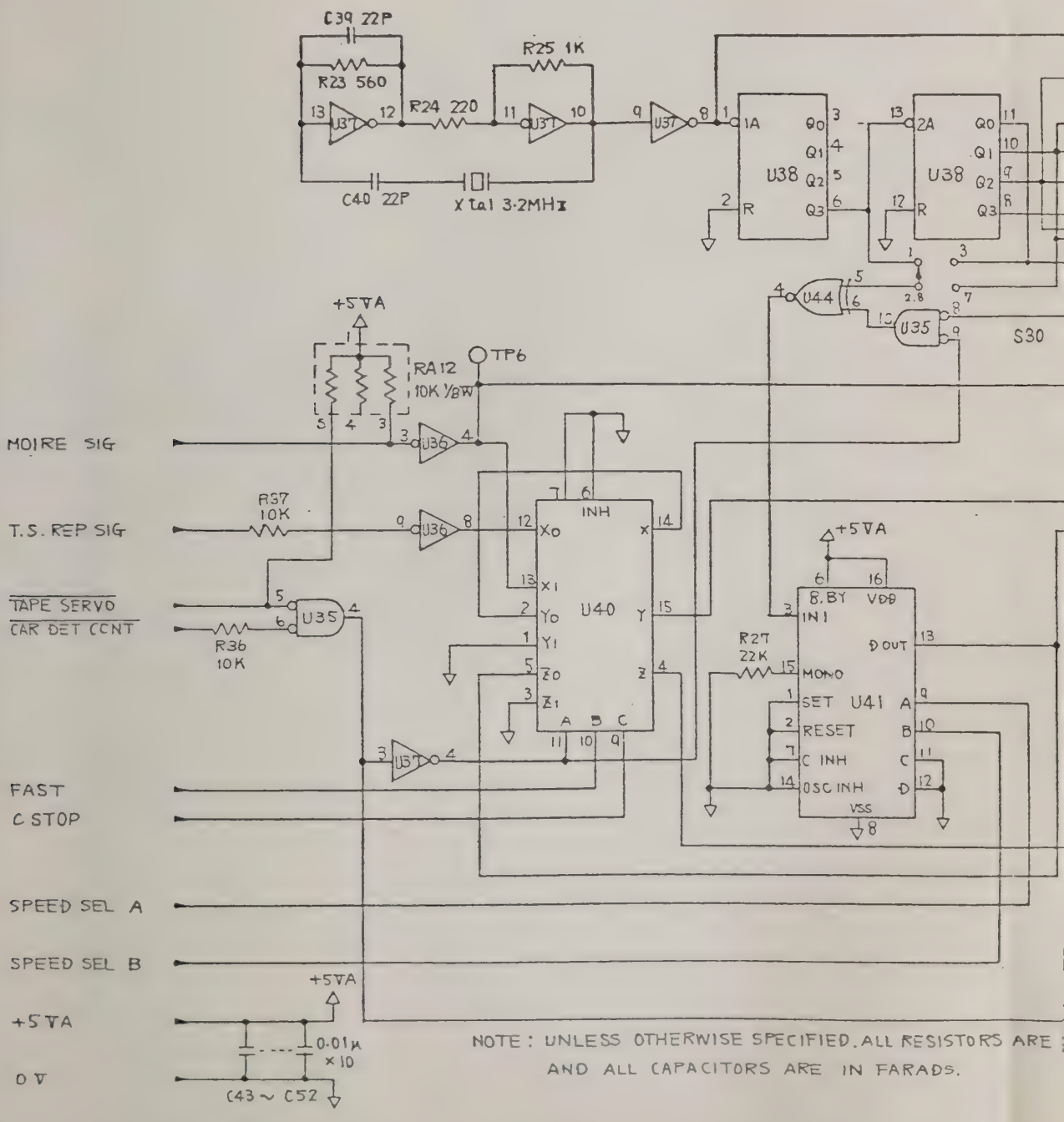
chematic Diagram-5 –CONTROL AMP Ass'y–



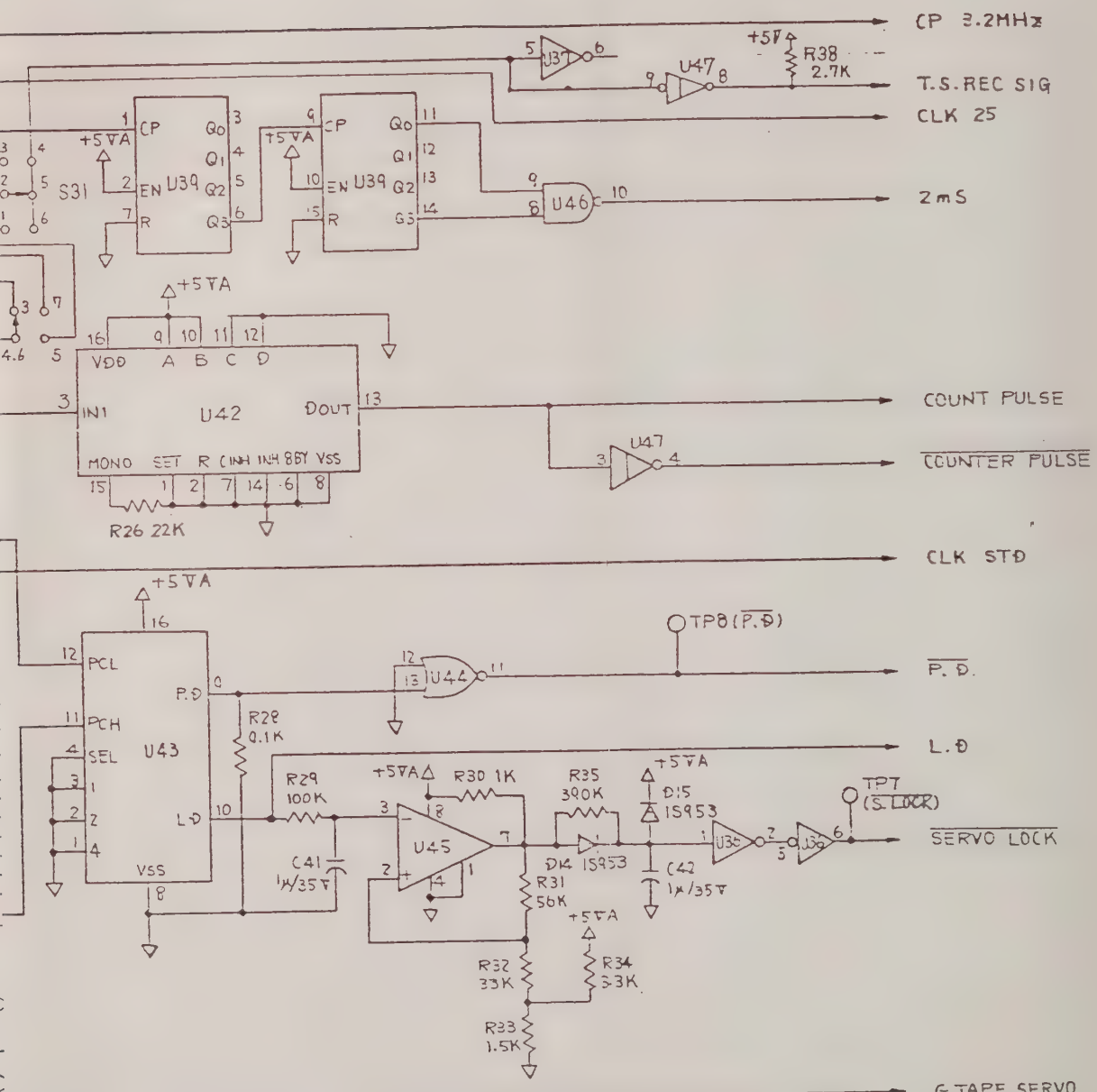


NOTE : UNLESS OTHERWISE SPECIFIED. ALL RESISTORS ARE IN OHMS.
1/4W, ±5%. RESISTOR ALLAYS ARE IN OHMS
1/8W, ±5%. AND ALL CAPACITORS ARE IN FARADS.

chematic Diagram-6 –CONTROL AMP Ass'y–



NOTE : UNLESS OTHERWISE SPECIFIED. ALL RESISTORS ARE
AND ALL CAPACITORS ARE IN FARADS.



IN OHMS .1/4W. 15%

S30. SETTING SPEED

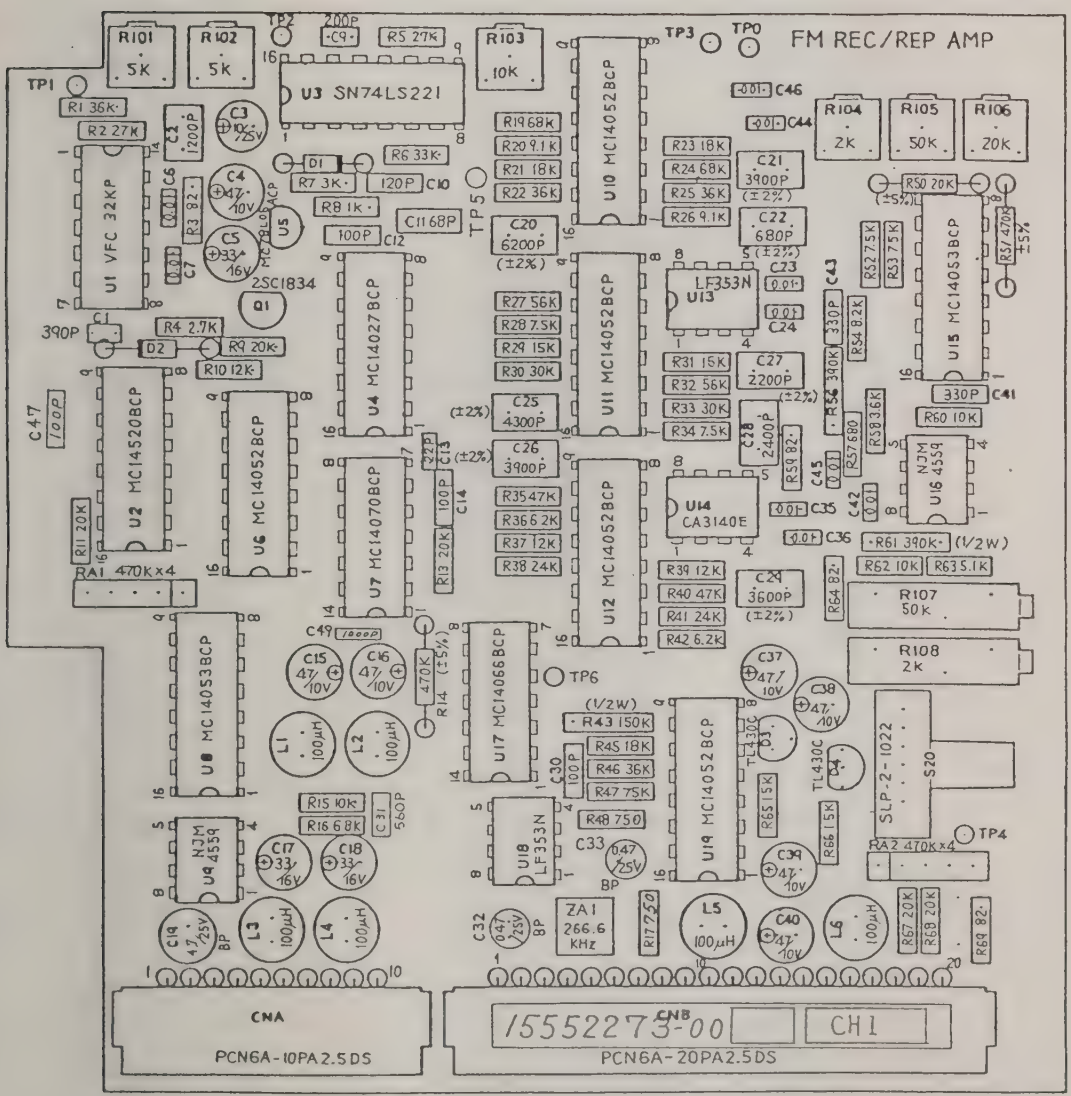
HIGH	MID	LOW
1—2	2—3	5—6
3—4	6—7	7—8

S31. SETTING SPEED

HIGH	MID	LOW
3—4	2—5	1—6
——	——	——

5-6 FM REC/REP AMP ASS'Y

5-6-1 PCBA (15552273-00)



Parts marked with an • require longer delivery time.

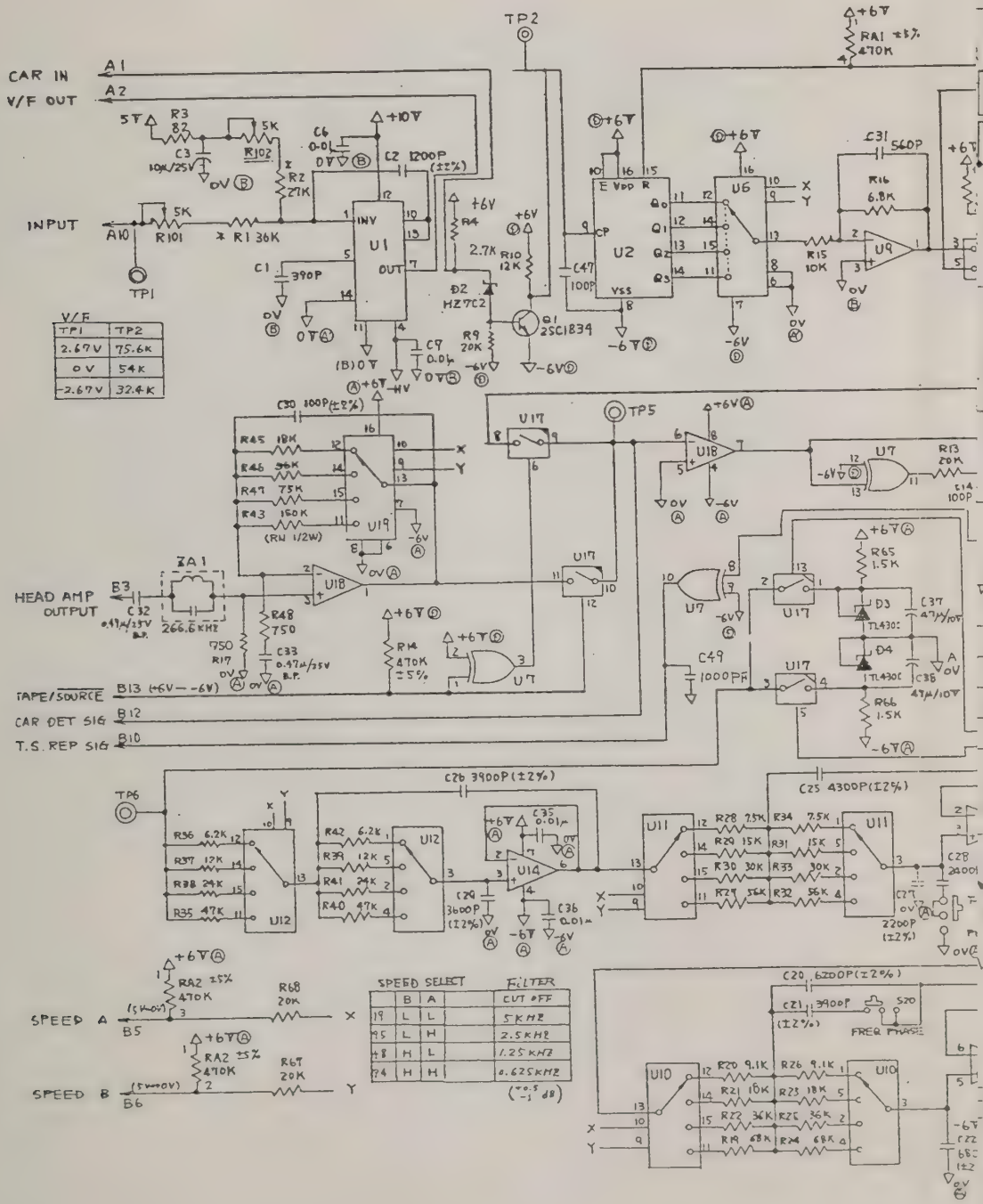
F. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
		- Resistors -		
R59, ,R69	11037820	RN 1/4W 82 ohm 1%	4	
59	11037681	RN 1/4W 680 ohm 1%	1	
7,R48	11037751	RN 1/4W 750 ohm 1%	2	
8	11037102	RN 1/4W 1k ohm 1%	1	
5,R66	11037152	RN 1/4W 1.5k ohm 1%	2	
7	11037302	RN 1/4W 3k ohm 1%	1	
58	11037362	RN 1/4W 3.6k ohm 1%	1	
63	11037512	RN 1/4W 5.1k ohm 1%	1	
36,R42	11037622	RN 1/4W 6.2k ohm 1%	2	
16	11037682	RN 1/4W 6.8k ohm 1%	1	
3,34,52	11037752	RN 1/4W 7.5k ohm 1%	3	
54	11037822	RN 1/4W 8.2k ohm 1%	1	
20,R26	11037912	RN 1/4W 9.1k ohm 1%	2	
0,R37, 9	11037123	RN 1/4W 12k ohm 1%	3	
5,R60, 2	11037103	RN 1/4W 10k ohm 1%	3	
9, R31	11037153	RN 1/4W 15k ohm 1%	2	
1,R23, 5	11037183	RN 1/4W 18k ohm 1%	3	
8,R41	11037243	RN 1/4W 24k ohm 1%	2	
0,R33	11037303	RN 1/4W 30k ohm 1%	2	
R6	11037333	RN 1/4W 33k ohm 1%	1	
,R22, 5,R46	11037363	RN 1/4W 36k ohm 1%	4	
,R5	11037273	RN 1/4W 27k ohm 1%	2	
5,R40	11037473	RN 1/4W 47k ohm 1%	2	
7,R32	11037563	RN 1/4W 56k ohm 1%	2	
9,R24	11037683	RN 1/4W 68k ohm 1%	2	
7,R53	11037753	RN 1/4W 75k ohm 1%	2	
,R11, 3,R67, 8	11037203	RN 1/4W 20k ohm 1%	5	
43	11020154	RN 1/2W 150k ohm 1%	1	
6,R61	11020394	RN 1/2W 390k ohm 1%	2	
4	11037272	RN 1/4W 2.7k ohm 1%	1	
50	11193203	RN 1/4W 20k ohm 1%	1	
4,R51	11193474	RN 1/4W 470k ohm 1%	2	

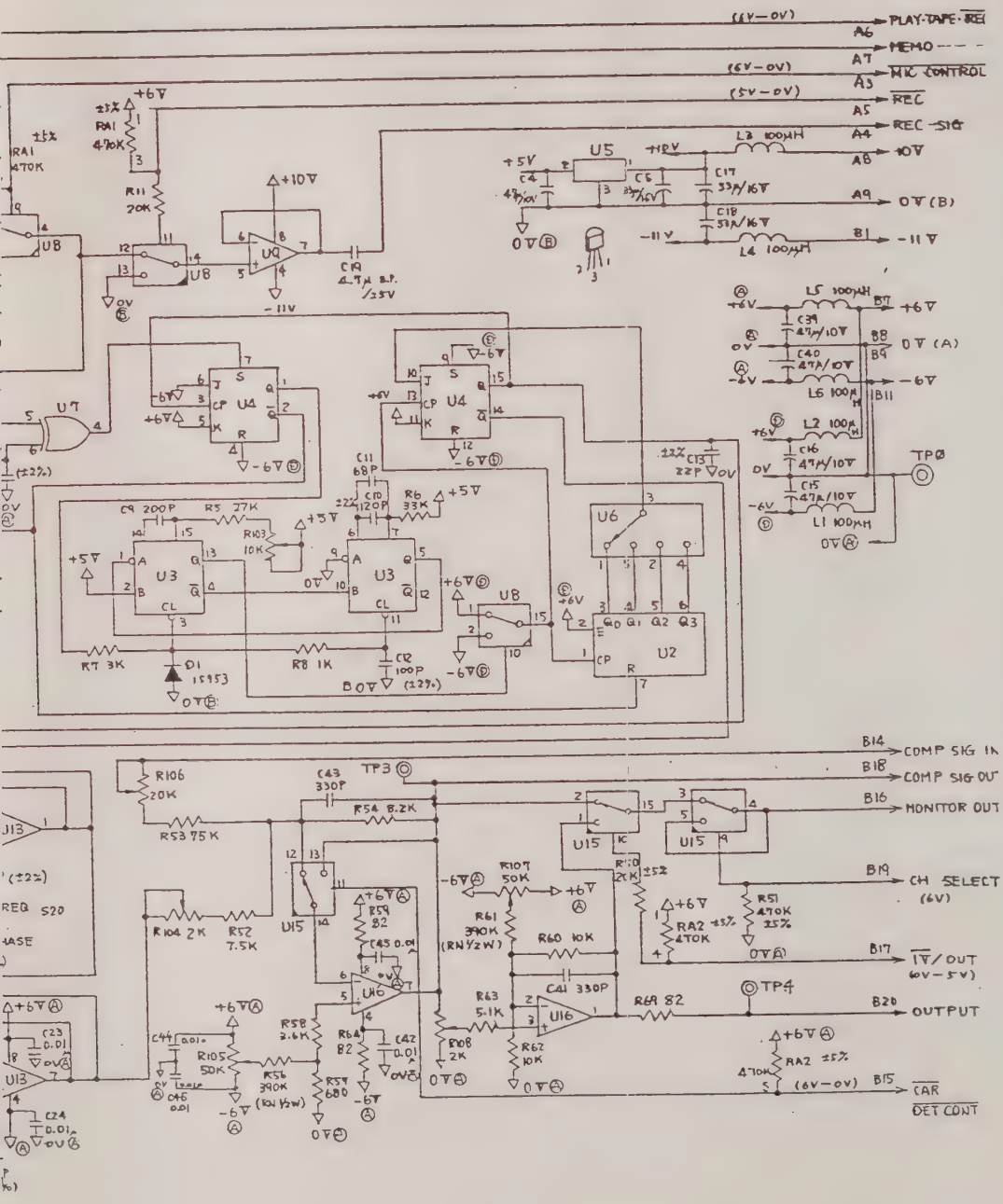
Parts marked with an * require longer delivery time.

F. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
,RA2	13492337	Resistor Array 4-element 470k 5%	2	
		- Variable Resistors -		
4	13256676	VR 2k ohm	1	
5	13256680	VR 50k ohm	1	
6	13256679	VR 20k ohm	1	
1,R102	13256677	VR 5k ohm	2	
8	13256281	VR 2k ohm	1	
7	13256286	VR 50k ohm	1	
3	13256678	VR 10k ohm	1	
	13424200	Transistor 2SC1834	1	
		- IC's -		
	13447188	VFC 32KP	1	
U10, ,U12	13441513	MC 14052BCP	5	
	13441464	SN 74LS221N	1	
	13441422	MC 14027BCP	1	
	13447185	MC 78L05ACP	1	
	13441386	MC 14520BCP	1	
	13441402	MC 14070BCP	1	
U15	13441434	MC 14053BCP	2	
U16	13447147	NJM 4559D-F	2	
	13447216	LM 353N	1	
	13447160	3240E	1	
	13447152	3140E	1	
	13441399	MC 14066BCP	1	
		- Capacitors -		
2	12901772	CQ 100V 0.00068MF 2%	1	
	12901784	CQ 100V 0.0012MF 2%	1	
9	12901796	CQ 100V 0.0022MF 2%	1	
3	12901798	CQ 100V 0.0024MF 2%	1	
9	12901806	CQ 100V 0.0036MF 2%	1	
1, C26	12901808	CQ 100V 0.0039MF 2%	2	
5	12901810	CQ 100V 0.0043MF 2%	1	
0	12901818	CQ 100V 0.0062MF 2%	1	
7	12901537	CC 50V 100PF 5%	1	
9	12901295	CC 50V 1000PF	1	

Parts marked with an * require longer delivery time

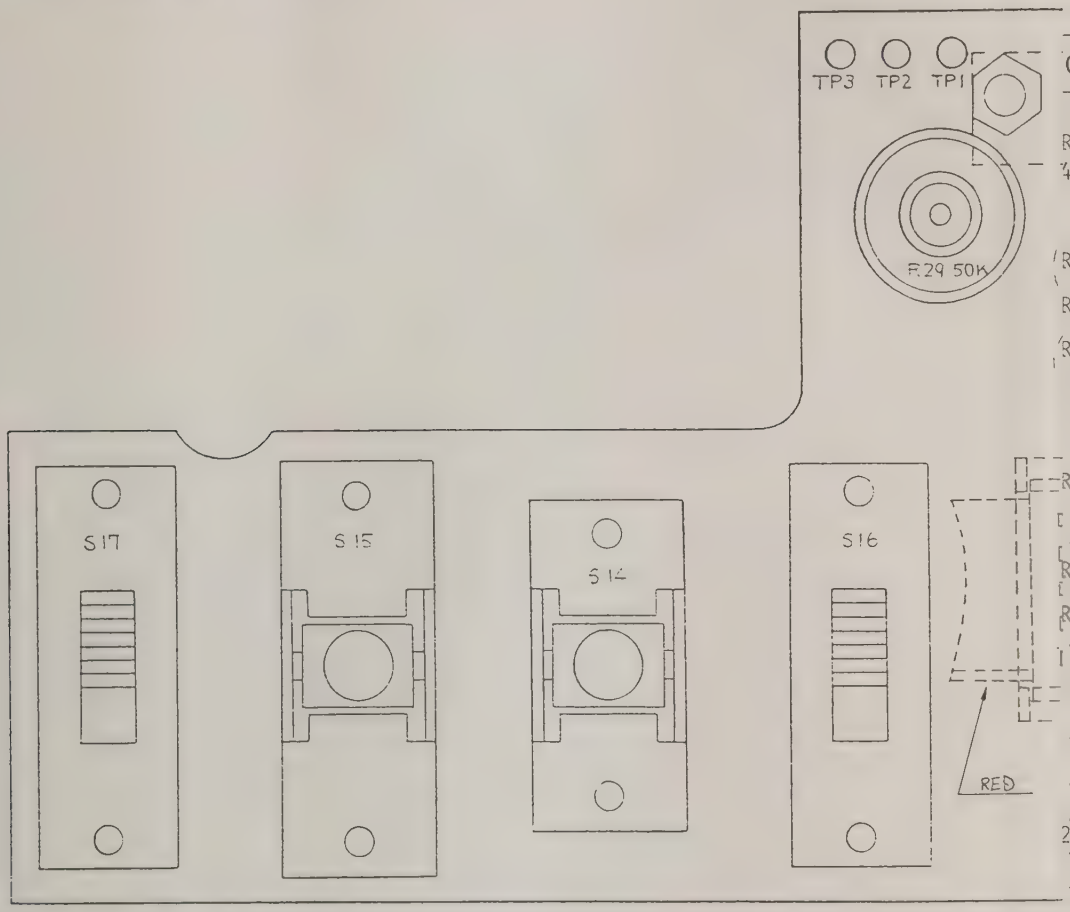
EF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
		- Capacitors -		
,C39, D,C15, 6,C37, 8	12901899	CE 10V 47MF 20%	7	
,C17, 8	12901902	CE 16V 33MF 20%	3	
	12901903	CE 25V 10MF 20%	1	
9	12901091	CE 25V 4.7MF	1	
2,C33	12901098	CE 50V 0.47MF	1	
	12381201	CC 50V 200PF 5%	1	
	12381391	CC 50V 390PF 5%	1	
,7,23, ,35,36, ,44,45,	12901621	CC 50V 0.01MF	10	
31	12901634	CC 50V 560PF ±10%	1	
41,C43	12901631	CC 50V 330PF ± 5%	2	
13	12901529	CC 50V 22PF ± 2%	1	
14,C12, 30	12901537	CC 50V 100PF ± 2%	3	
10	12901538	CC 50V 120PF ± 2%	1	
11	12382680	CC 50V 68PF	1	
		- Diodes -		
1	13413020	1S953	1	
3,D4	13415307	Zener TL 430C	2	
2	13415190	Zener HZ 7C2	1	
1,2,3,4, ,6	14722080	Coil, Choke 100uH	6	
P0 ~ TP6	13189145	Terminal TEST POINT	7	
20	13224111	Switch, Slide	1	
CNA	13150819	Connector 10P	1	
CNB	13150823	Connector 20P	1	
ZA1	13493408-00	Erase Trap	1	


CAR IN
V/F OUT
INPUT
HEAD AMP OUTPUT
TAPE/SOURCE
CAR DET SIG
T.S. REP SIG
SPEED A
SPEED B
TP1
TP2
TP5
TP6
U1
U2
U6
U7
U9
U10
U11
U12
U14
U17
U18
U19
V/F
TP1 TP2
2.67V 75.6K
0V 54K
-2.67V 32.4K
SPEED SELECT
B A FILTER
L L CUT OFF
L H 5KHZ
H L 2.5KHZ
H H 1.25KHZ
0.625KHZ
NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN OHMS ±1%
ALL CAPACITORS IN FARADS.


PLAY-TAPE-REF
MEMO
MIC CONTROL
REC
REC SIG
+10V
0V (B)
-11V
L3 100μH
L4 100μH
L5 100μH
L6 100μH
L2 100μH
L1 100μH
+6V
0V (A)
-6V
TP0
U5
U4
U3
U6
U2
U8
U7
U9
U10
U15
U16
TP3
TP4
COMP SIG IN
COMP SIG OUT
MONITOR OUT
CH SELECT (6V)
OUTPUT
CAR DET CONT

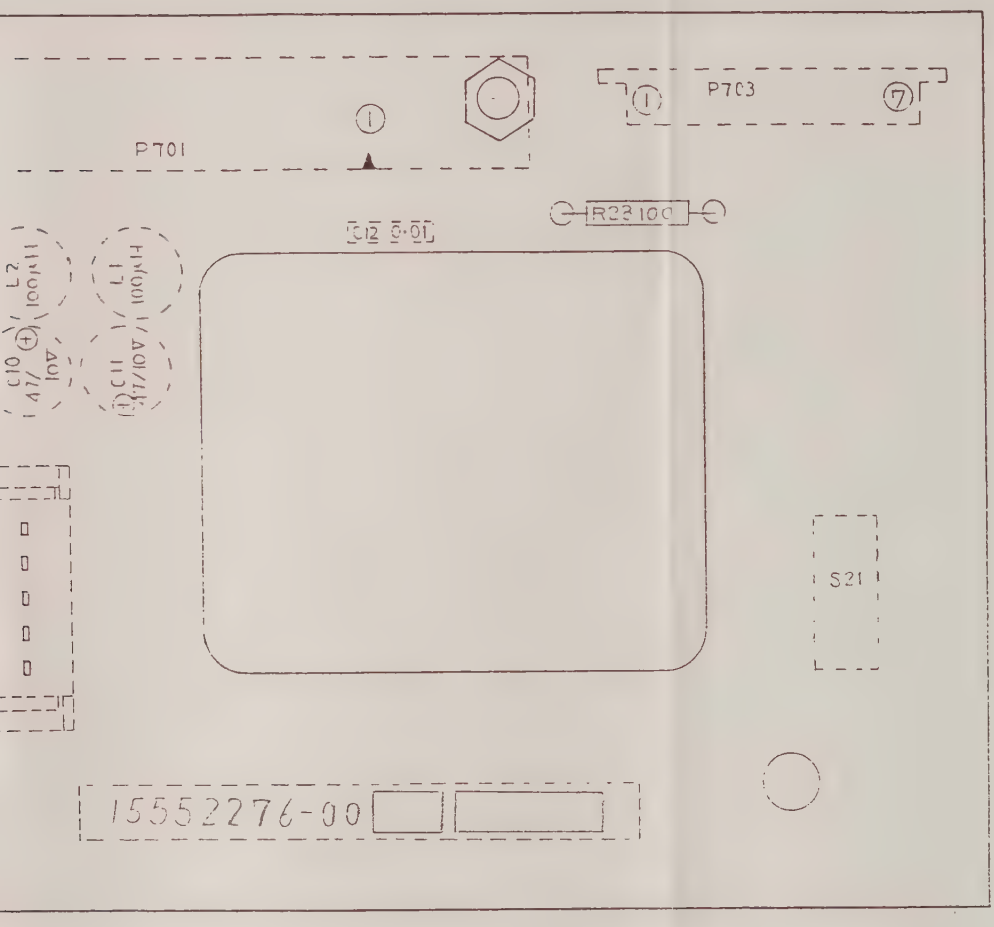
7 SW & CAL AMP ASS'Y

7-1 SW & CAL AMP (A) Ass'y (15552276-00) and Parts List



Parts marked

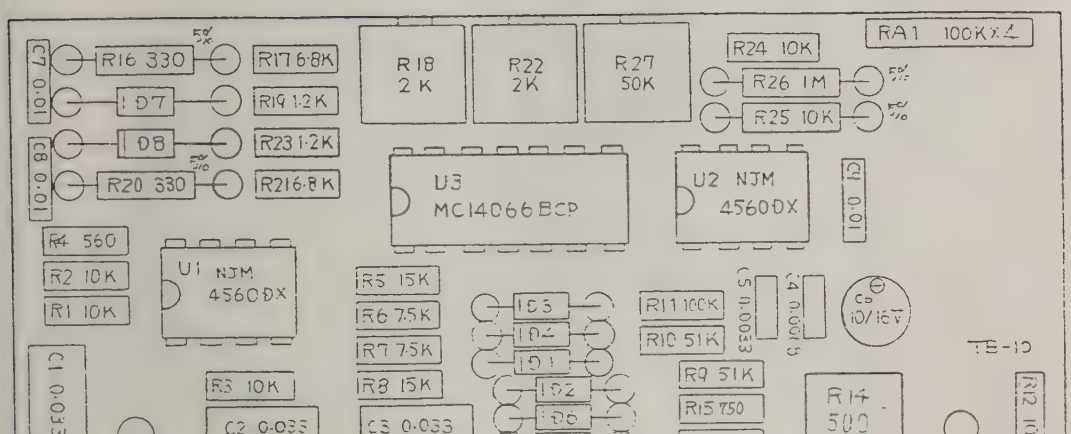
REF. NO.	PARTS NO.	DESCRIPTION
S16, 17	13224122	Switch, Slide SSB042
S14	13220222	Lever, Switch SLE64201
S15	13220324	Lever, Switch SLE64301
S21	13224118	Switch, Slide SSS 1-2
R29	13252034	Variable Resistor VR 50k ohm
R28	11193101	Resistor RD 1/4W 100 ohm ± 5%
L1, L2	14722080	Coil, choke 100uH
C10, 11	12901899	Capacitor CE 10V 47MF 20%
C12	12901626	Capacitor CC 50V 0.01MF
TP1~TP3	13189145	Terminal, TEST POINT
P701	13120966	Connector 20P
P703	13151568	Connector 20P
TB9~TB10	13061162-00	Harness Ass'y (302)



with an * require longer delivery time.

Q'TY	REMARKS
2	
1	
1	
1	
1	
1	
2	
2	
1	
3	
1	
1	
1	

2 SW & CAL AMP (B) Ass'y (15552277-00) and Parts List

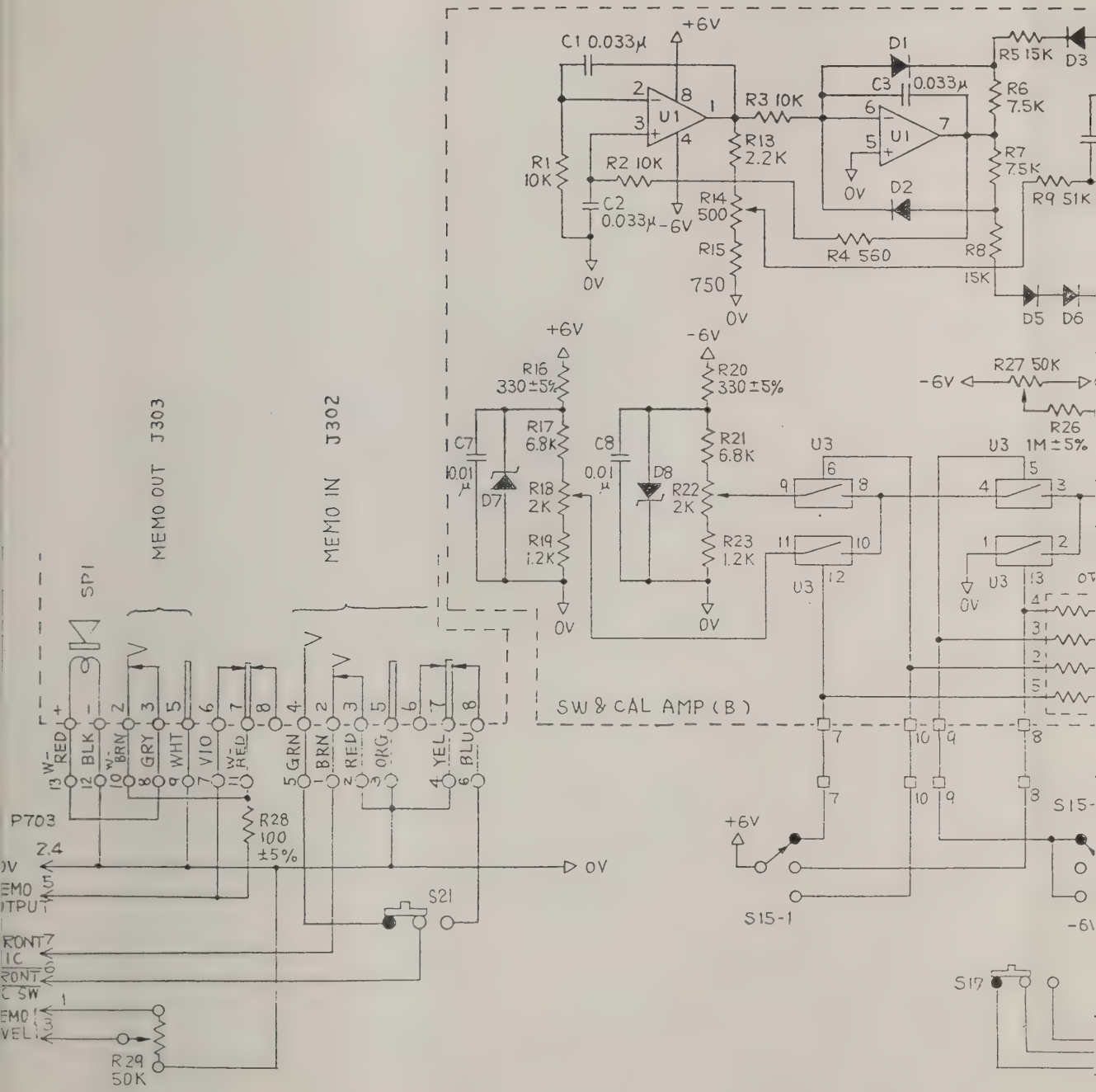


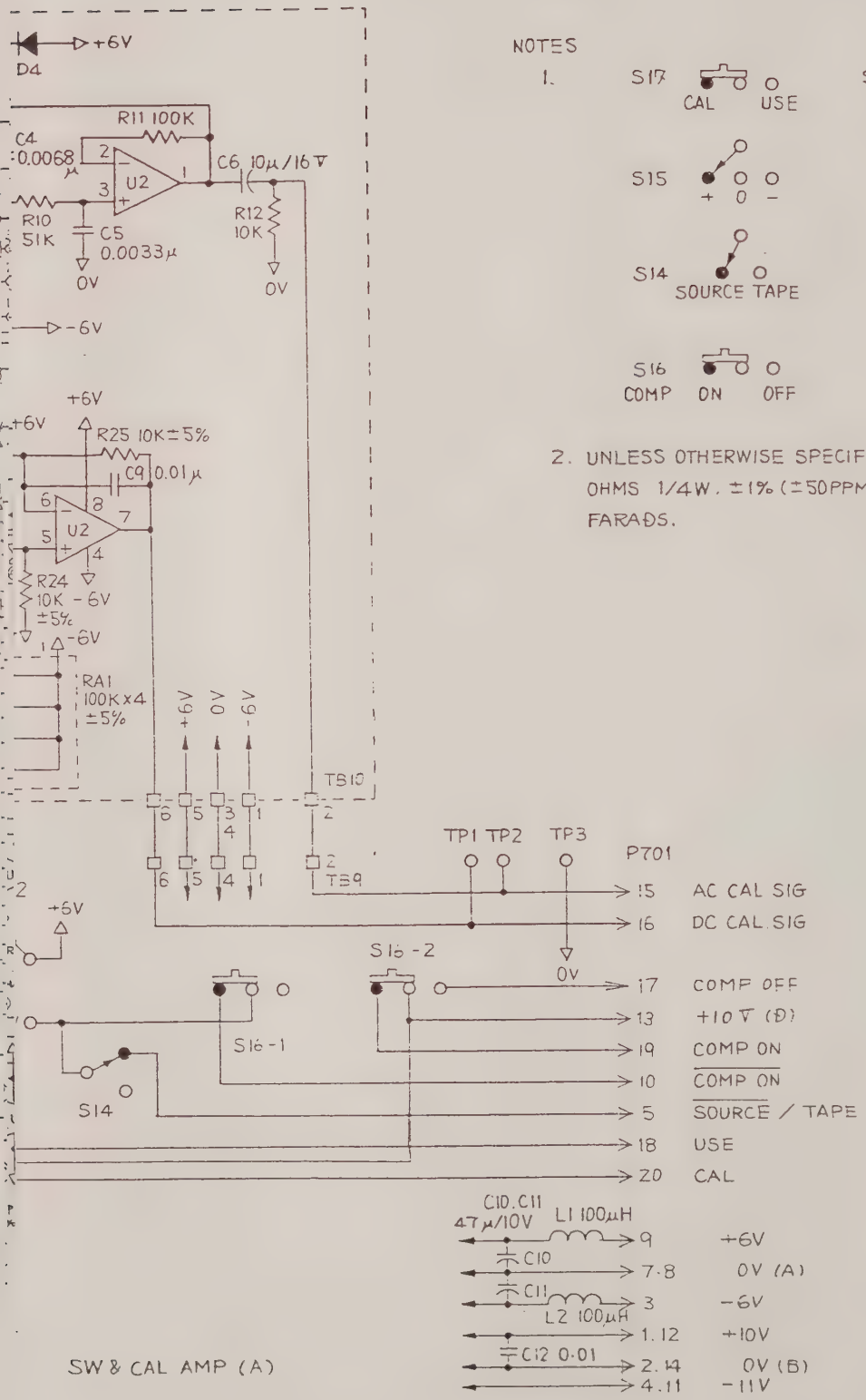
REF. NO
R1,R2,R
R12,R24
R4
R5, R
R6, R
R9, R
R11
R13
R19,R
R15
R17,R
R16,R
R25
R26
R14
R18,R22
R27
D7,D8
D1~D6
RA1
C1~C3
C5
C4
C6
C7,C8,C
U1, U2
U3

Parts marked with an * require longer delivery time.

	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
		- Resistors -		
,	11037103	RN 1/4W 10k ohm 1%	5	
	11037561	RN 1/4W 560 ohm 1%	1	
3	11037153	RN 1/4W 15k ohm 1%	2	
7	11037752	RN 1/4W 7.5k ohm 1%	2	
0	11037513	RN 1/4W 51k ohm 1%	2	
	11037104	RN 1/4W 100k ohm 1%	1	
	11037222	RN 1/4W 2.2k ohm 1%	1	
23	11037122	RN 1/4W 1.2k ohm 1%	2	
	11037751	RN 1/4W 750 ohm 1%	1	
21	11037682	RN 1/4W 6.8k ohm 1%	2	
20	11193331	RN 1/4W 330 ohm 5%	2	
	11193101	RN 1/4W 10k ohm 5%	1	
	11193105	RN 1/4W 1M ohm 5%	1	
		- Variable Resistors -		
	13256674	VR 500 ohm 20%	1	
	13256676	VR 2k ohm 20%	2	
	13256680	VR 50k ohm 20%	1	
		- Diodes -		
	13415174	Zener HZ5C -1	2	
	13413020	Diode 1S953	6	
	13492321	Resistor Array 4-element 100k 5%	1	
		- Capacitors -		
	12901852	CQ 100V 0.0033MF 2%	3	
	12901804	CQ 100V 0.0033MF 2%	1	
	12901820	CQ 100V 0.0068MF 2%	1	
	12901900	CE 16V 10MF 20%	1	
9	12901626	CC 50V 0.01MF	3	
		- IC's -		
	13447220	Linear NJM4560D-D	2	
	13441399	IC MC14066BCP	1	

7-3 Schematic Diagram — SW & CAL AMP (A) & (B) Ass'y —





NOTES

1.

S17 CAL / USE

S21 MEMO /DATA / MEMO ONLY

S15 + 0 −

S14 SOURCE TAPE

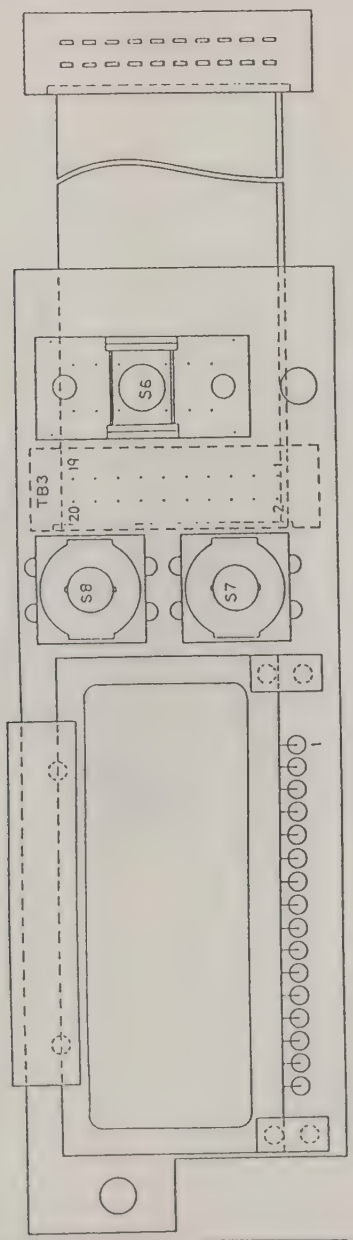
S16 COMP ON OFF

2. UNLESS OTHERWISE SPECIFIED ALL RESISTORS IN OHMS 1/4W. ±1% (±50PPM). ALL CAPACITORS IN FARADS.

SW & CAL AMP (A)

5-8 OPERATION BOARD ASS'Y

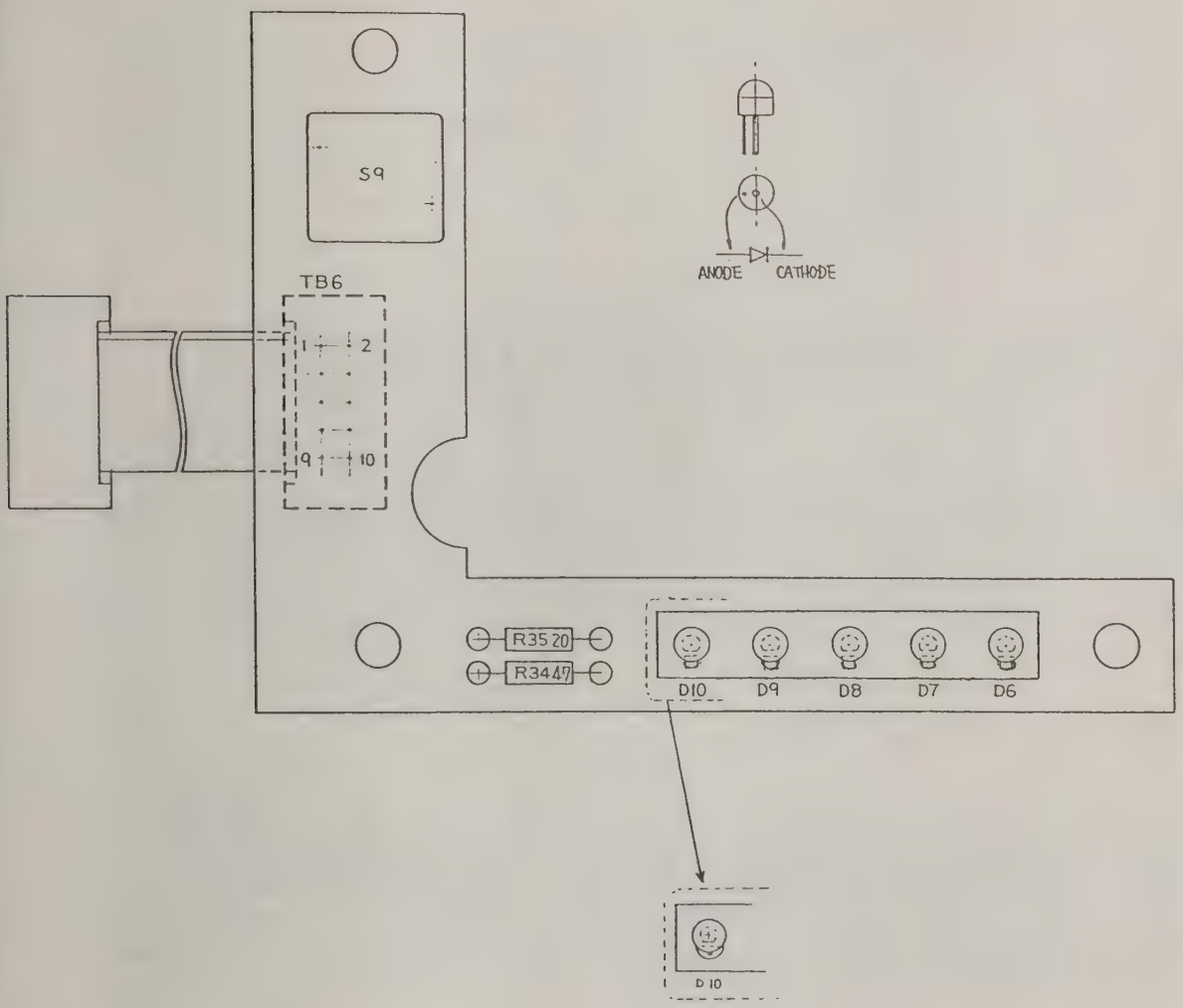
5-8-1 OPERATION (B) BOARD Ass'y (15552284-00) and Parts List



Parts marked with an * require longer delivery time.

F. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
1	13293002	Indicator FIP4B8	1	
2	16786754-00	Bracket, Holder (B)	1	
3	13222246	Switch, Push EVQ-PBR-12K	2	
4	13220222	Switch, Lever SLE64201	1	
5	13061155-00	Harness Ass'y (202)	1	
6	16786753-00	Bracket, Holder (A)	2	

5-8-2 OPERATION (C) BOARD Ass'y (15552285-00) and Parts List

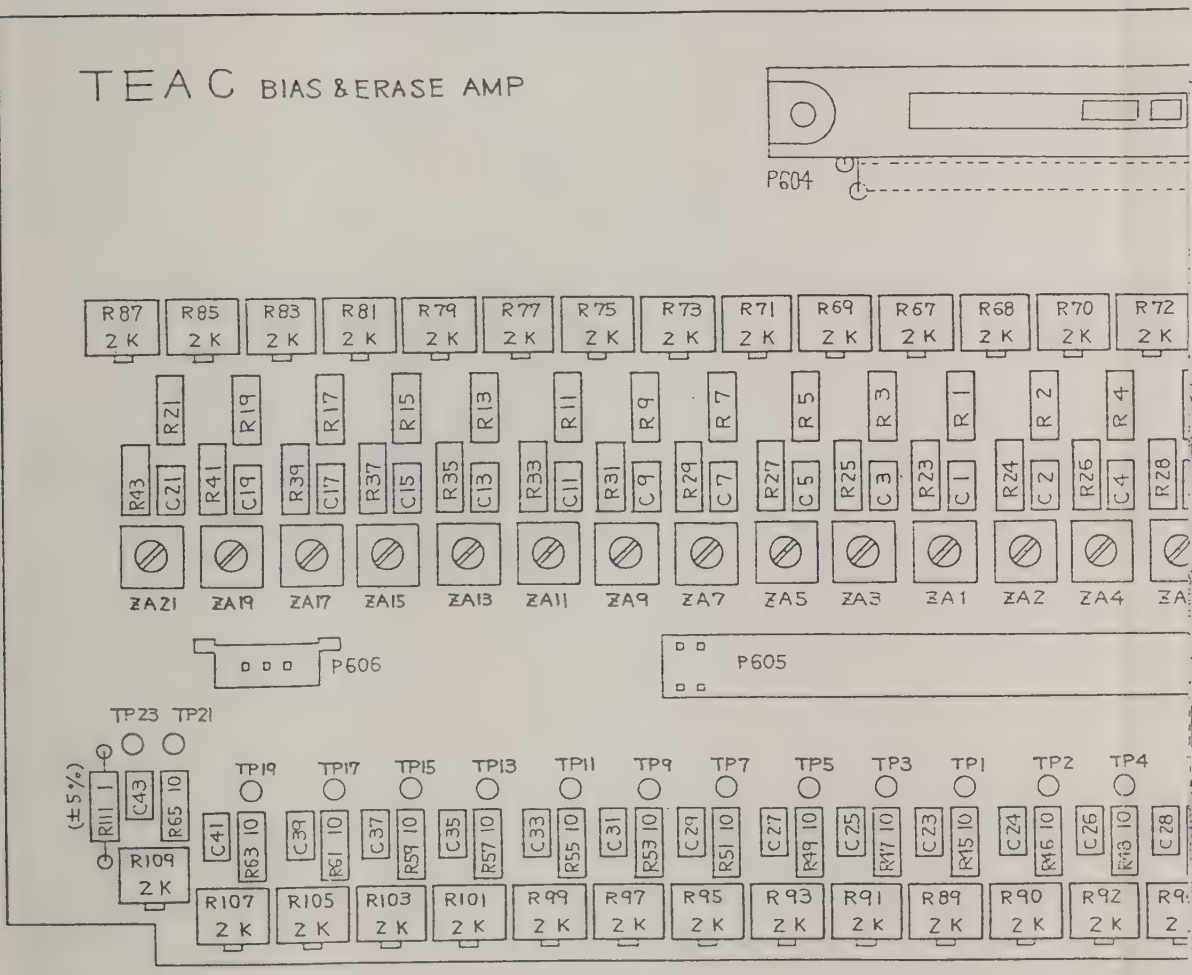


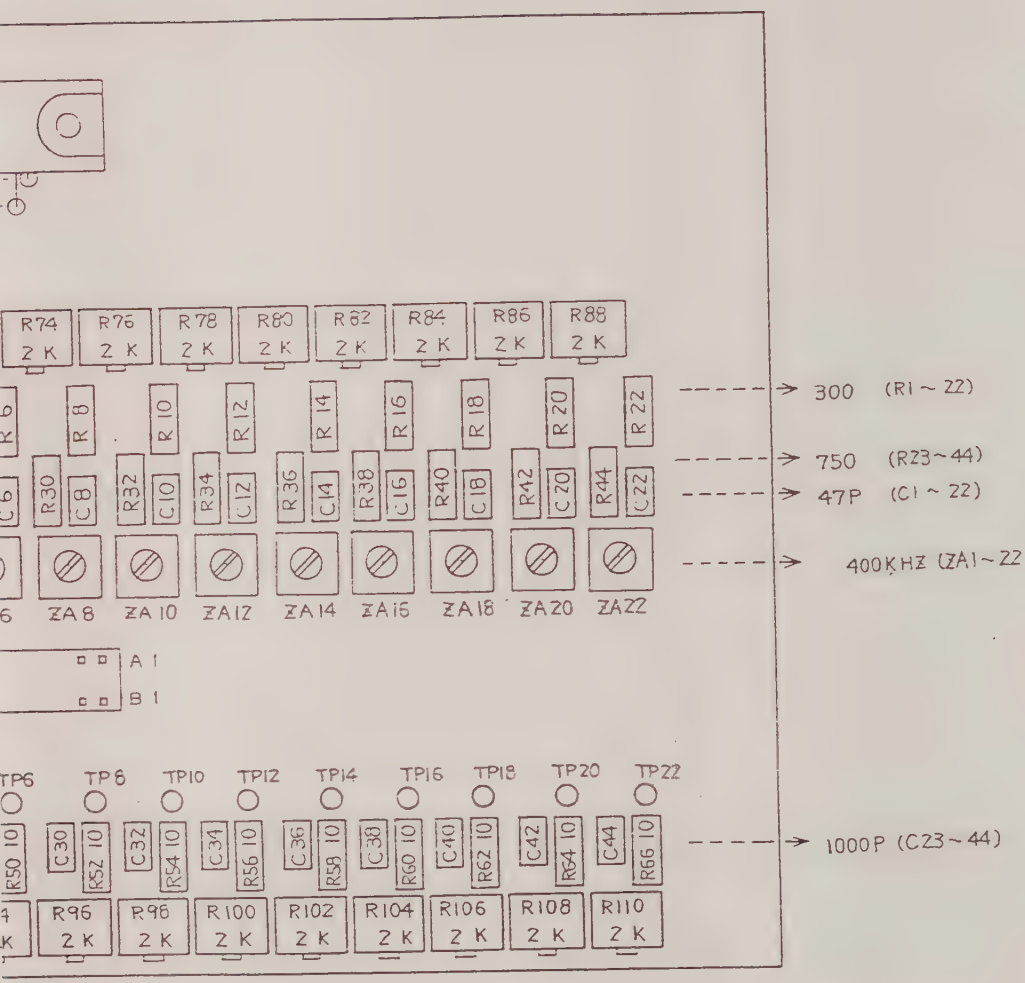
Parts marked with an * require longer delivery time.

F. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
1	13222236	Switch, Push S9	1	
2	13061154-00	Harness Ass'y (201)	1	
3	16786787-00	Spacer A	1	
4	13352286-00	OPERATION BOARD (C) BOARD	1	
5	13419090	Photoelectric Transducer	1	
6	13429089	Photoelectric Transducer	1	

BIAS & ERASE AMP ASS'Y

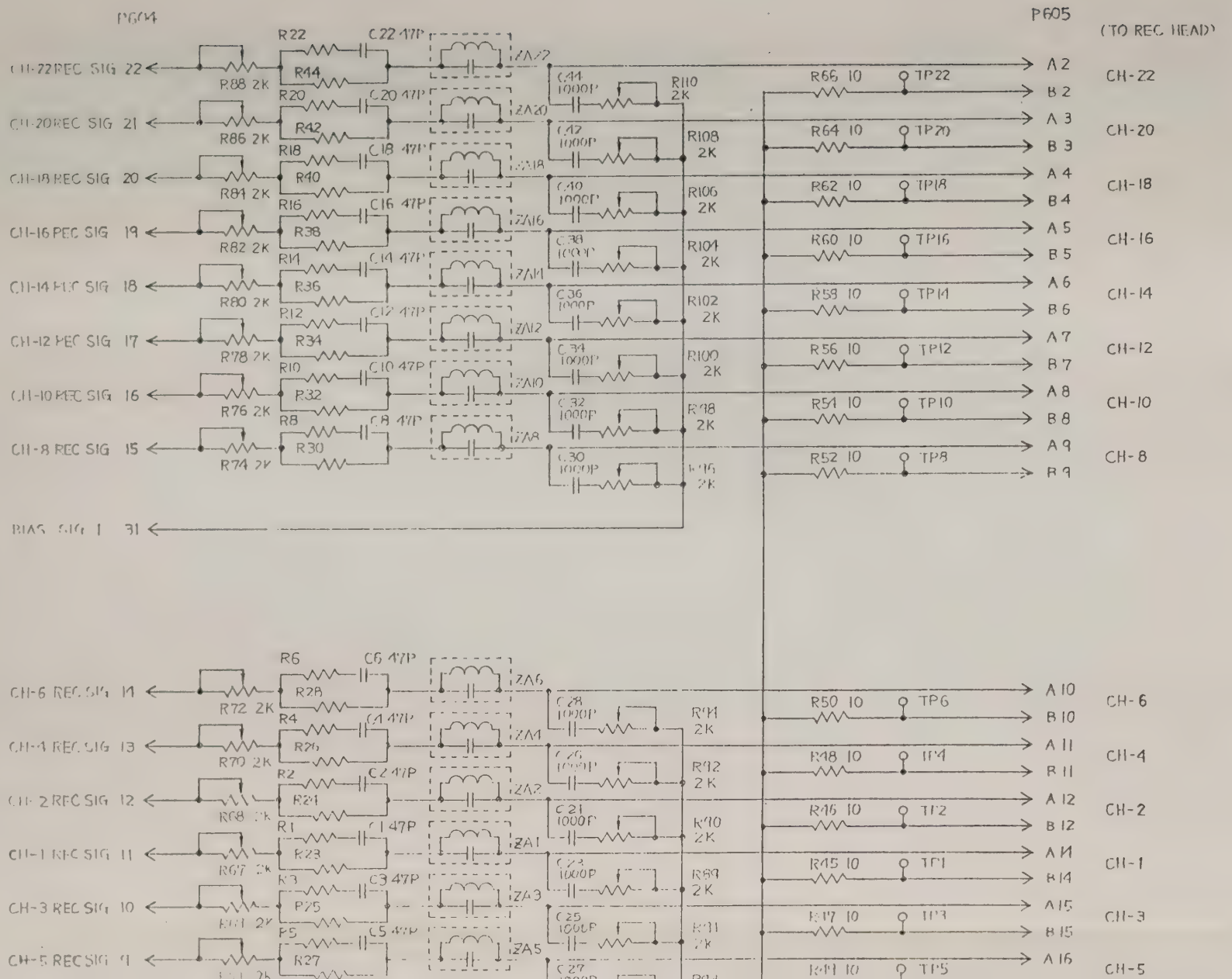
-1 PCBA (15552474-00)



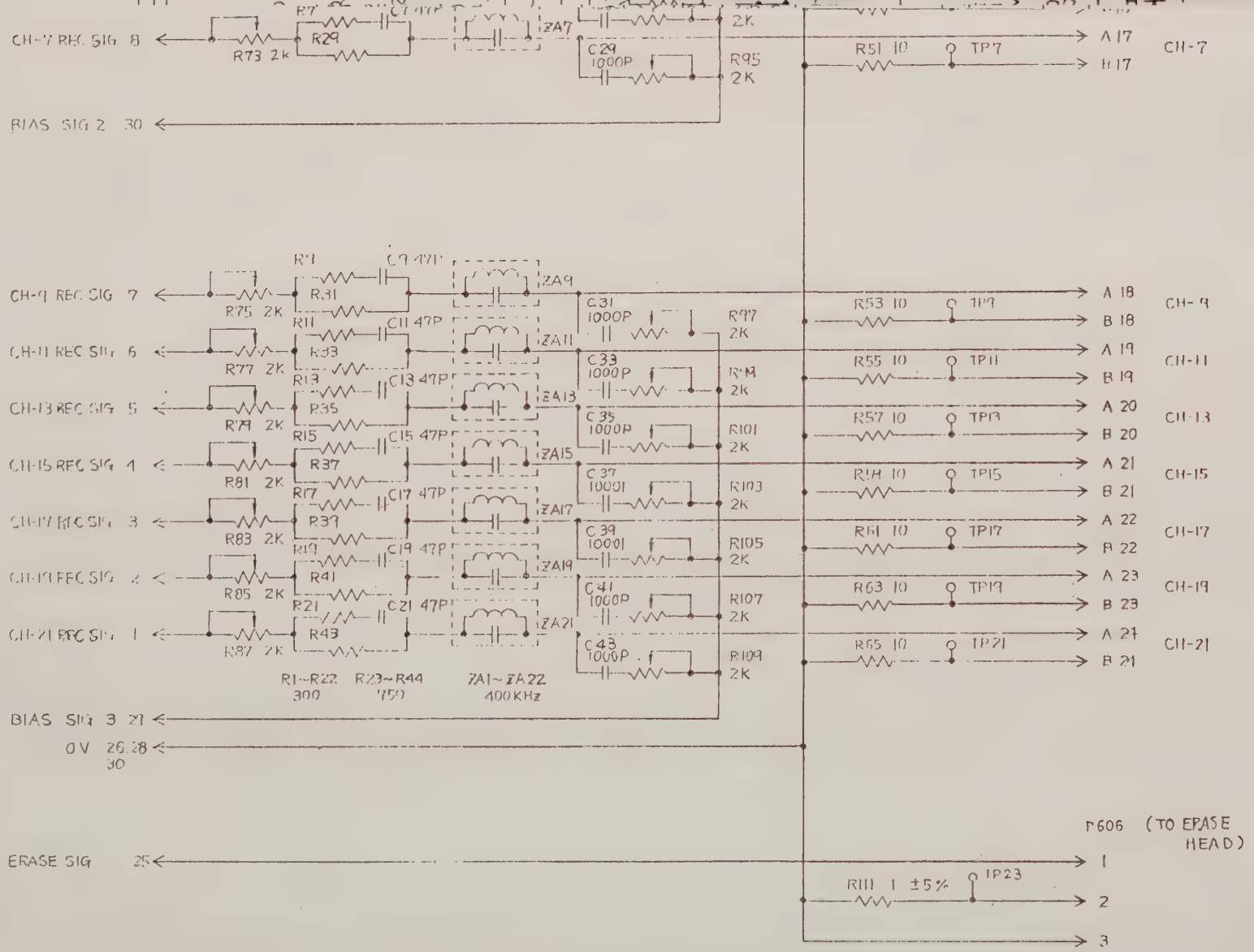

R74 2K
R76 2K
R78 2K
R80 2K
R82 2K
R84 2K
R86 2K
R88 2K
R 8
R 10
R 12
R 14
R 16
R 18
R 20
R 22
C 8
C 10
C 12
C 14
C 16
C 18
C 20
C 22
R30
R32
R34
R36
R38
R40
R42
R44
ZA8
ZA 10
ZA12
ZA14
ZA16
ZA18
ZA20
ZA22
A 1
B 1
TP6
TP8
TP10
TP12
TP14
TP16
TP18
TP20
TP22
C30
C32
C34
C36
C38
C40
C42
C44
R50 10
R52 10
R54 10
R56 10
R59 10
R60 10
R62 10
R64 10
R66 10
R96 2K
R98 2K
R100 2K
R102 2K
R104 2K
R106 2K
R108 2K
R110 2K
300 (R1 ~ 22)
750 (R23~44)
47P (C1 ~ 22)
400KHZ (ZA1~22
1000P (C23~44)

Parts marked with an * require longer delivery time.

. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
		- Resistors -		
~ R22	11037301	RN 1/4W 300 ohm 1%	22	
~ R44	11037751	RN 1/4W 750 ohm 1%	22	
~ R66	11037100	RN 1/4W 10 ohm 1%	22	
1	11193109	RD 1/4W 1 ohm 5%	1	
~ R88	13256676	Variable rsistor VR 2k ohm	44	
		- Capacitors -		
~ C22	12901554	CC 50V 47pF ±2%	22	
~ C44	12901781	CQ 100V 1000pF 5%	22	
~ZA22	14723327-00	Bias Trap	22	
~TP23	13189145	Terminal, Test Point	24	
6	13151566	Connector 3P	1	
4	13120834	Connector 31P	1	
5	13120981	Connector 50P	1	

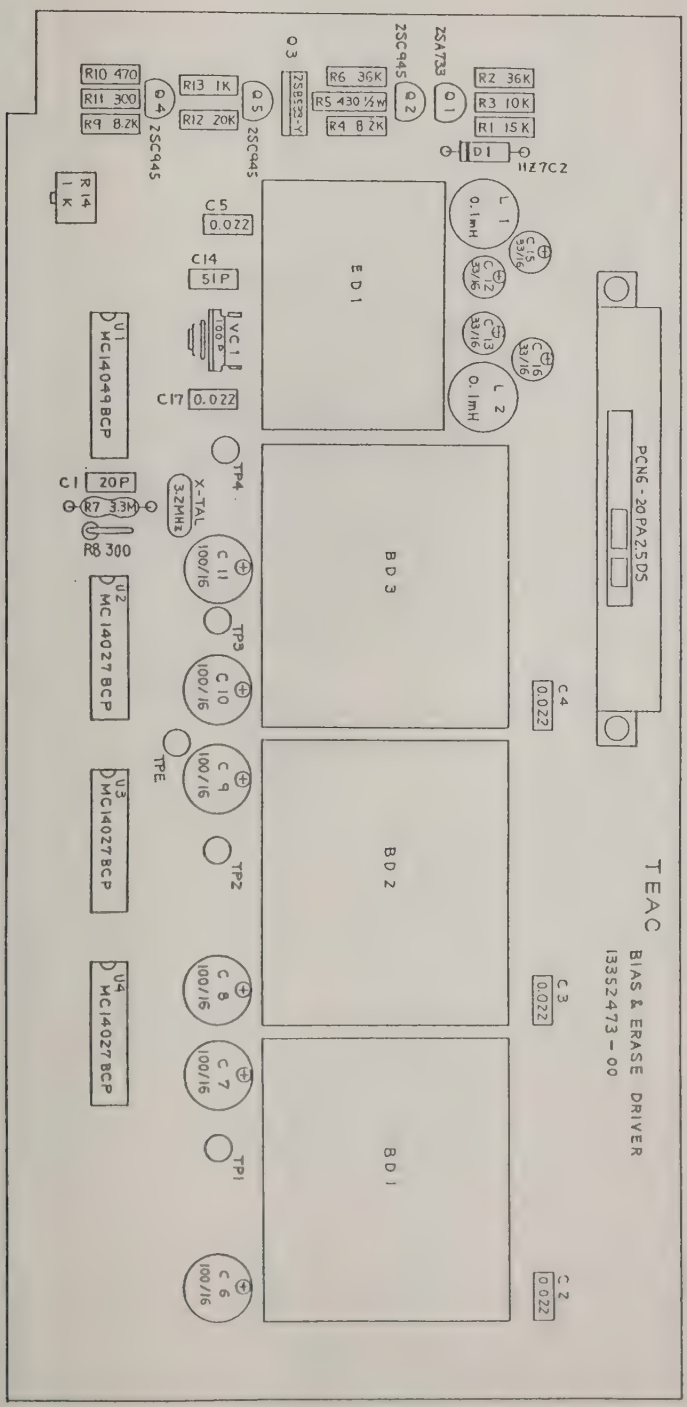


NOTE : UNLESS OTHERWISE SPECIFIED ALL REGISTORS ARE IN OHMS, ±1%, 1/4 W.
ALL CAPACITORS ARE IN MICRO FARADS.


CH-7 REC SIG 8
R73 2K
R29
C29 1000P
R95 2K
BIAS SIG 2 30
R51 10
TP7
A 17
B 17
CH-7
CH-9 REC SIG 7
R75 2K
R31
C31 1000P
R97 2K
R53 10
TP9
A 18
B 18
CH-9
CH-11 REC SIG 6
R77 2K
R33
C33 1000P
R99 2K
R55 10
TP11
A 19
B 19
CH-11
CH-13 REC SIG 5
R79 2K
R35
C35 1000P
R101 2K
R57 10
TP13
A 20
B 20
CH-13
CH-15 REC SIG 4
R81 2K
R37
C37 1000P
R103 2K
R59 10
TP15
A 21
B 21
CH-15
CH-17 REC SIG 3
R83 2K
R39
C39 1000P
R105 2K
R61 10
TP17
A 22
B 22
CH-17
CH-19 REC SIG 2
R85 2K
R41
C41 1000P
R107 2K
R63 10
TP19
A 23
B 23
CH-19
CH-21 REC SIG 1
R87 2K
R43
C43 1000P
R109 2K
R65 10
TP21
A 24
B 21
CH-21
R1~R22 300
R23~R44 750
ZA1~ZA22 400KHz
BIAS SIG 3 27
0V 26,28 30
P606 (TO ERASE HEAD)
ERASE SIG 25
R111 1 ±5%
TP23
1
2
3

5-10 BIAS & ERASE DRIVER AMP ASS'Y

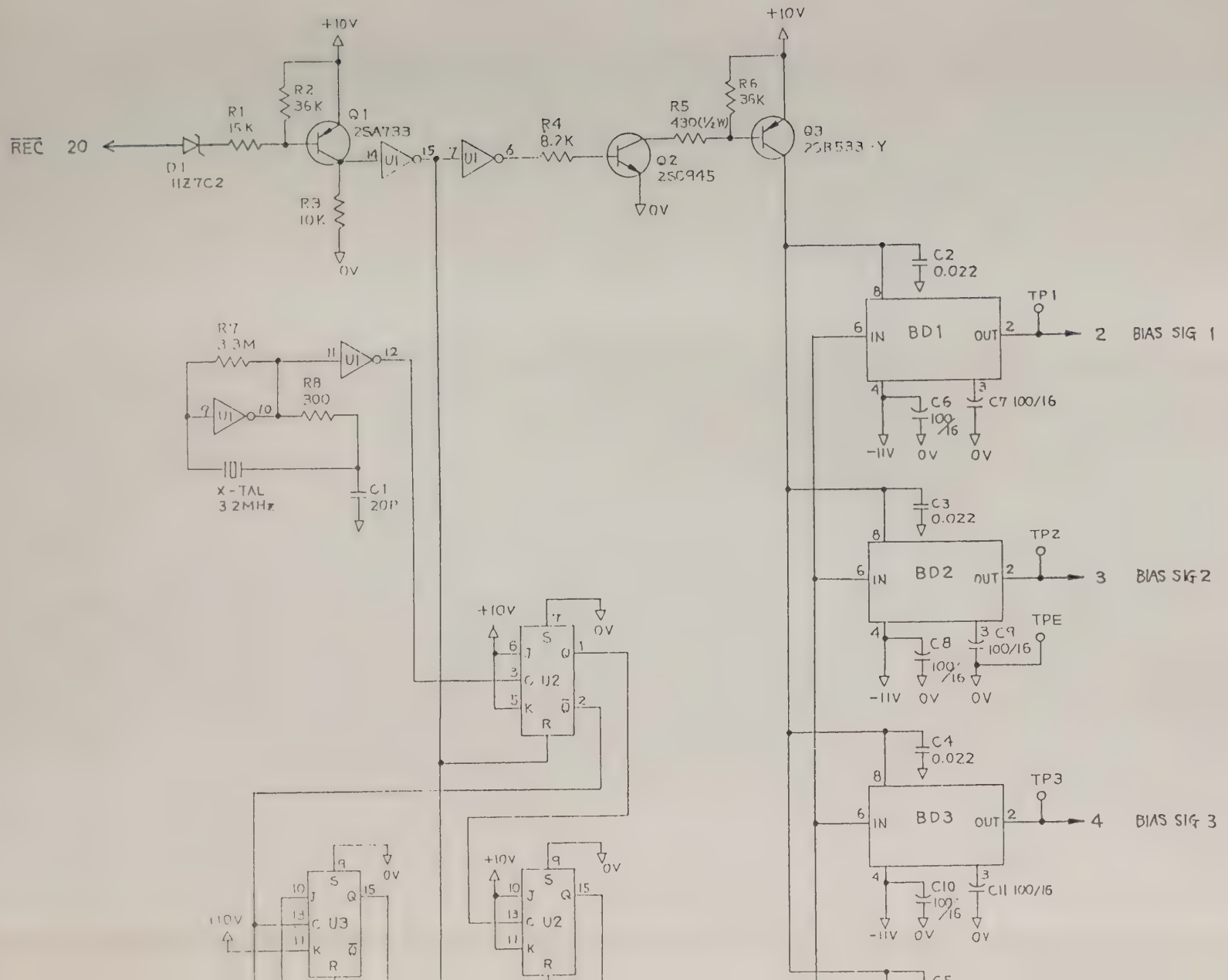
5-10-1 PCBA (15552473-00)



BIAS & ERASE DRIVER PCBA

Parts marked with an * require longer delivery time

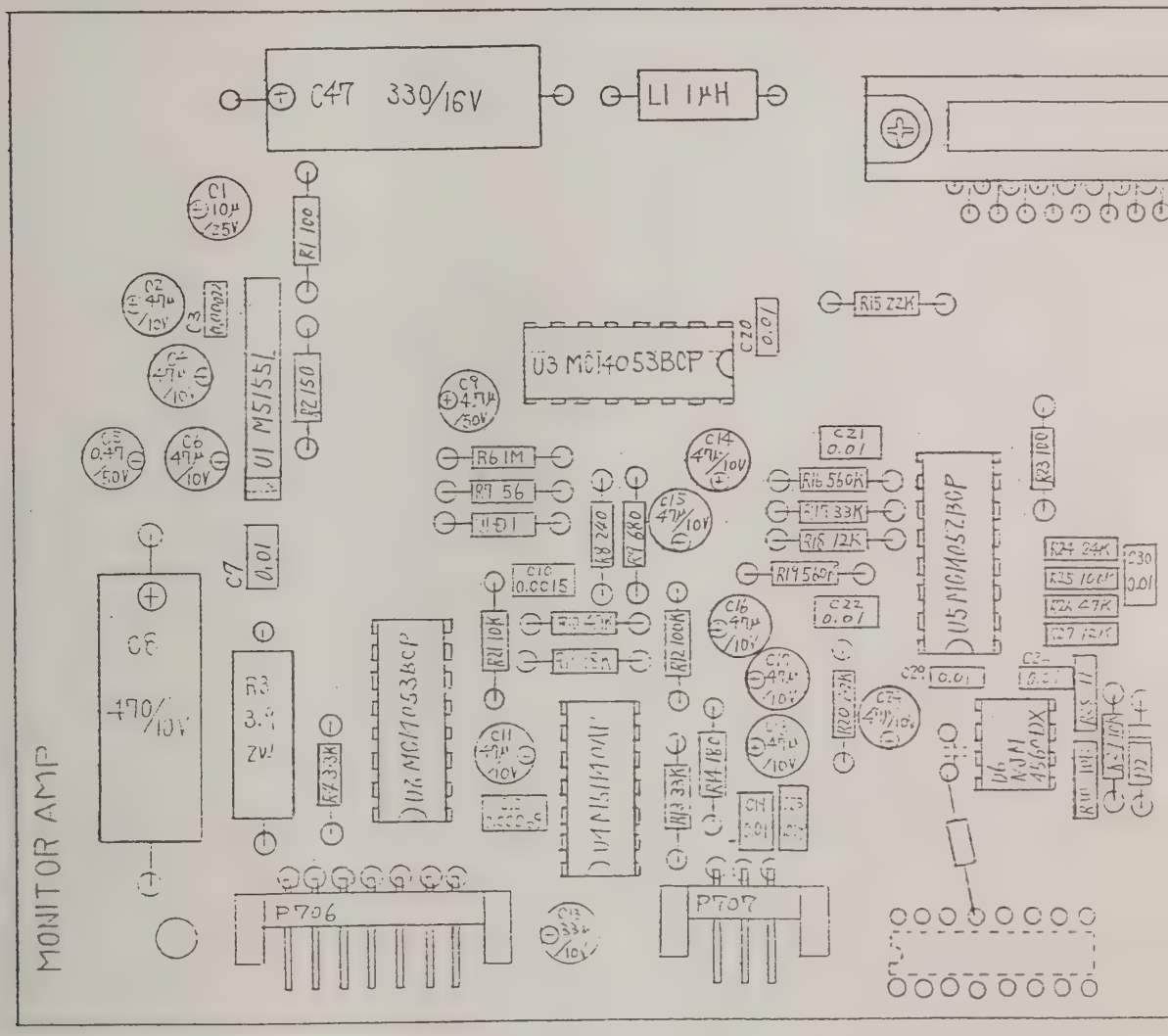
REF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
		- IC's -		
U1	13441383	MC 14049BCP	1	
U2,3,4	13441422	MC 14027BCP	3	
		- Resistors -		
R1	11037153	RN 1/4W 15k ohm 1%	1	
R2,6	11037363	RN 1/4W 36k ohm 1%	1	
R3	11037103	RN 1/4W 10k ohm 1%	1	
R4,9	11037822	RN 1/4W 8.2k ohm 1%	2	
R5	11020431	RN 1/4W 430 ohm 2%	1	
R10	11037471	RN 1/4W 470 ohm 1%	1	
R12	11037203	RN 1/4W 20k ohm 1%	1	
R14	11037102	RN 1/4W 1k ohm 1%	1	
R7	11197335	RD 1/4W 3.3M ohm 5%	1	
R14	13256675	Variable resistor VR 1k ohm	1	
R8	11036301	RN 1/4W 300 ohm 1%	1	
R11	11037301	RN 1/4W 300 ohm 1%	1	
		- Transistors -		
Q1	13421089	2SA733P.K.	1	
Q2,4,5	13424133	2SC945	3	
Q3	13423098	2SB533Y	1	
D1	13415190	Zener Diode HZ7C2	1	
X'tal	13295053	Oscillator 3.2MHz	1	
BD1,2,3	13493406-00	Bias Driver	3	
ED1	13493407-00	Erase Driver	1	
		- Capacitors -		
C1	12530200	DM 15F 20pF	1	
C2,3,4,5	12901622	CC 50V 0.0022MF	4	
C6,7,8,9 10,11	12900805	CE 16V 100MF	6	
C12,13,15 16	12900803	CE 16V 33MF	4	
C14	12535510	DM 15F 510J1	1	
C17	12901845	CQ 100V 0.022MF	1	
VC1	12899015	Trimmer,Condenser 100p	1	
L1,2	14723156	Choke Coil 0.1mH	2	
TP0~TP4	13189145	Terminal, Test Point	5	


+10V
R2 36K
R1 15K
Q1 2SA733
REC 20
D1 1IZ7C2
R3 10K
0V
R4 8.7K
R5 430(½W)
R6 36K
Q3 2SB533-Y
Q2 2SC945
R7 3.3M
R8 300
X-TAL 3.2MHz
C1 20P
C2 0.022
C3 0.022
C4 0.022
TP1
TP2
TP3
TPE
BD1
BD2
BD3
IN
OUT
C6 100/16
C7 100/16
C8 100/16
C9 100/16
C10 100/16
C11 100/16
-11V
2 BIAS SIG 1
3 BIAS SIG 2
4 BIAS SIG 3
U1
U2
U3

NOTE: UNLESS OTHERWISE SPECIFIED ALL REGISTORS IN OHMS, ±1%, 1/4W.
ALL CAPACITORS ARE IN MICROFARADS.
ERASE SW
TP4
C14 51P
C17 0.022
VC1 10UP
ED1
C13 33/16
C12 33/16
0.022
-11V
0V
+10V
Q4 2SC945
Q5 2SC945
R9 8.2K
R10 470
R11 300
R12 20K
R13 1K
R14 1K
U1
U3
U4
U14
C15 33/16
C16 33/16
L1 0.1mH
0.1mH
+10V 8
0V 7
-11V 6

5-11 MONITOR AMP ASS'Y

5-11-1 PCBA (15552306-01)



U18 MC14053 BCP
U13 MC14001BCP
U15 MC14011BCP
U14 MC14001BCP
U16 MC14093BCP
U11 MC14053 BCP
U12
RA1 470KX4
R101
50K
TP2
TP1

MONITOR AMP PCBA-1

Parts marked with an * require longer delivery time.

REF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
		- IC's -		
U2,3,11, 18	13441434	MC 14053BCP	4	
U15	13441379	MC 14011BCP	1	
U13,14	13441378	MC 14001BCP	2	
U16	13441413	MC 14093BCP	1	
U8	13441422	MC 14027BCP	1	
U7	13441598	MC 14038BCP	1	
U5,9	13441513	MC 14052BCP	2	
U12	13447152	CA 3140E	1	
U6	13447220	Linear NJM4560-DX	1	
U4	13447210	Linear M51140AP	1	
U1	13447211	Linear M5155L	1	
		- Resistors -		
R7	11193560	RD 1/4W 56 ohm 5%	1	
R2	11193151	RD 1/4W 150 ohm 5%	1	
R1,23,61	11193101	RD 1/4W 100 ohm 5%	3	
R14	11193181	RD 1/4W 180 ohm 5%	1	
R8	11193241	RD 1/4W 240 ohm 5%	1	
R9	11193681	RD 1/4W 680 ohm 5%	1	
R59,60	11193102	RD 1/4W 1k ohm 5%	1	
R73	11193203	RD 1/4W 20k ohm 5%	1	
R21,29, 46,47,51 52	11193103	RD 1/4W 10k ohm 5%	6	
R20,53, 54	11193222	RD 1/4W 2.2k ohm 5%	3	
R4	11193332	RD 1/4W 3.3k ohm 5%	1	
R10	11193472	RD 1/4W 4.7k ohm 5%	1	
R18	11193123	RD 1/4W 12k ohm 5%	1	
R11	11193183	RD 1/4W 18k ohm 5%	1	
R15,48, 62,63	11193223	RD 1/4W 22k ohm 5%	4	
R13,17	11193333	RD 1/4W 33k ohm 5%	2	
R12	11193104	RD 1/4W 100k ohm 5%	1	
R25,31	11037104	RN 1/4W 100k ohm 1%	2	
R32,33, 49,50, 64	11193474	RN 1/4W 470k ohm 5%	5	

MONITOR AMP PCBA-2

Parts marked with an * require longer delivery time.

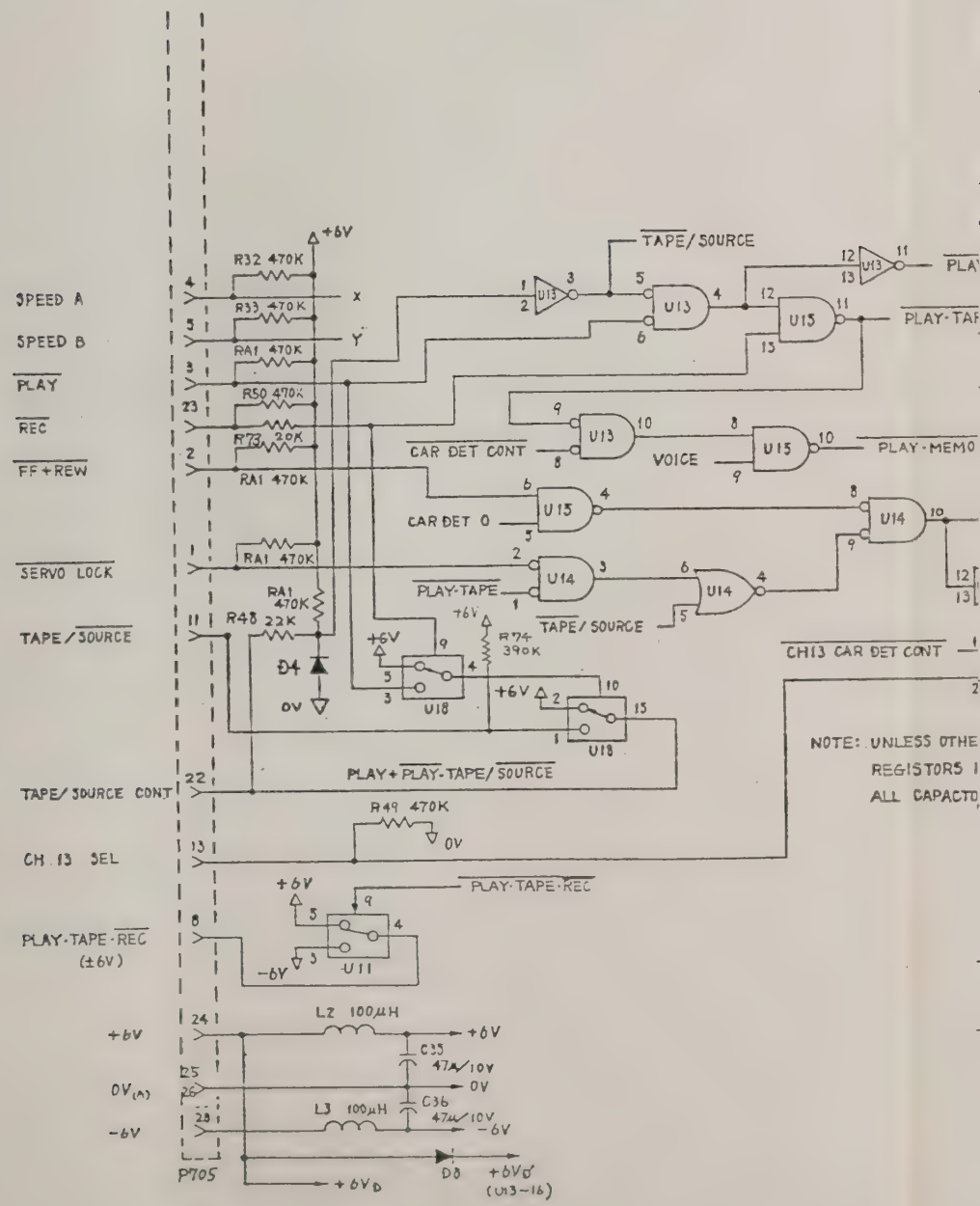
REF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
		- Resistors -		
R16,19	11193564	RD 1/4W 560k ohm 5%	2	
R6	11193105	RD 1/4W 1M ohm 5%	1	
R24	11037243	RN 1/4W 24k ohm 1%	1	
R28,55,56	11037102	RN 1/4W 1k ohm 1%	3	
R74	11193394	RD 1/4W 390k ohm 5%	1	
R27	11037123	RN 1/4W 12k ohm 1%	1	
R57	11037912	RN 1/4W 9.1k ohm 1%	1	
R30	11037473	RN 1/4W 10k ohm 1%	1	
R26	11037473	RN 1/4W 47k ohm 1%	1	
R58	11020824	RN 1/4W 820k ohm 1%	1	
RA1	13492337	Array 4-element 470k 5%	1	
R3	11200629	Cemented 2W 3.9 ohm 5%	1	
L1	14723187	Coil, Choke 1uH	1	
L2,3	14722080	Coil, Choke 100uH	2	
R101	13256680	Variable Resistor VR 50k ohm	1	
D1,2,3,4,5,6,7,8	13413020	Diodes 1S953	8	
		- Capacitors -		
C2,4,6,11,14 18,24,35,36	12901899	CE 10V 47MF 20%	15	
C13	12901902	CE 16V 33MF 20%	1	
C9,41	12901915	CE 50V 4.7MF 20%	2	
C5	12901911	CE 50V 0.47MF 20%	1	
C8	12900912	CE 10V 470MF	1	
C47	12900923	CE 16V 330MF	1	
C1	12901903	CE 25V 10MF	1	
C3	12901629	CC 50V 220PF ±5%	1	
C12	12901773	CQ 100V 0.00068MF 5%	1	
C10	12901789	CQ 100V 0.0015MF 5%	1	
C23	12901537	CC 50V 100PF 2%	1	
C20,26,29,39,40	12901621	CC 50V 0.01MF	5	

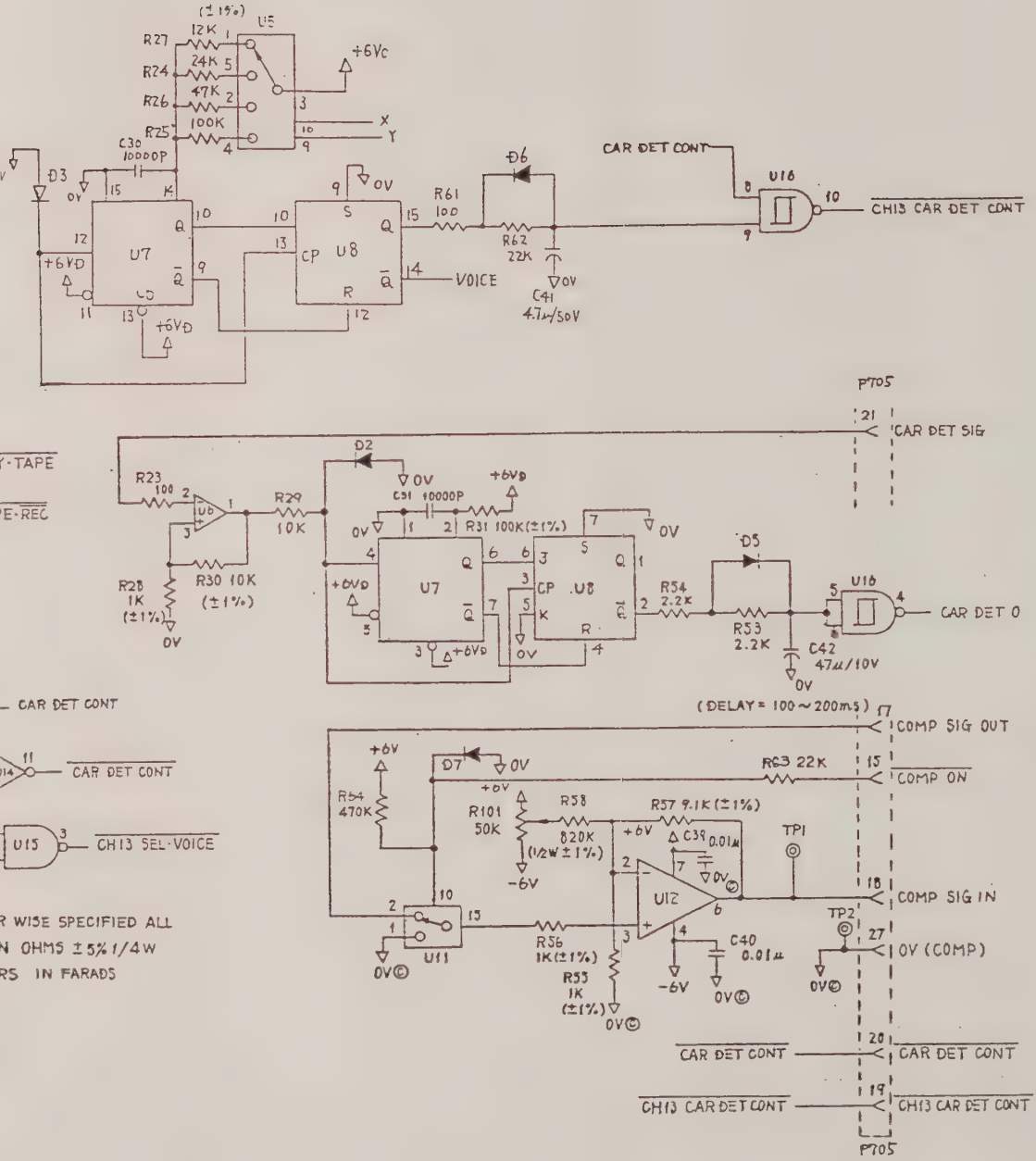
MONITOR AMP PCBA-3

Parts marked with an * require longer delivery time.

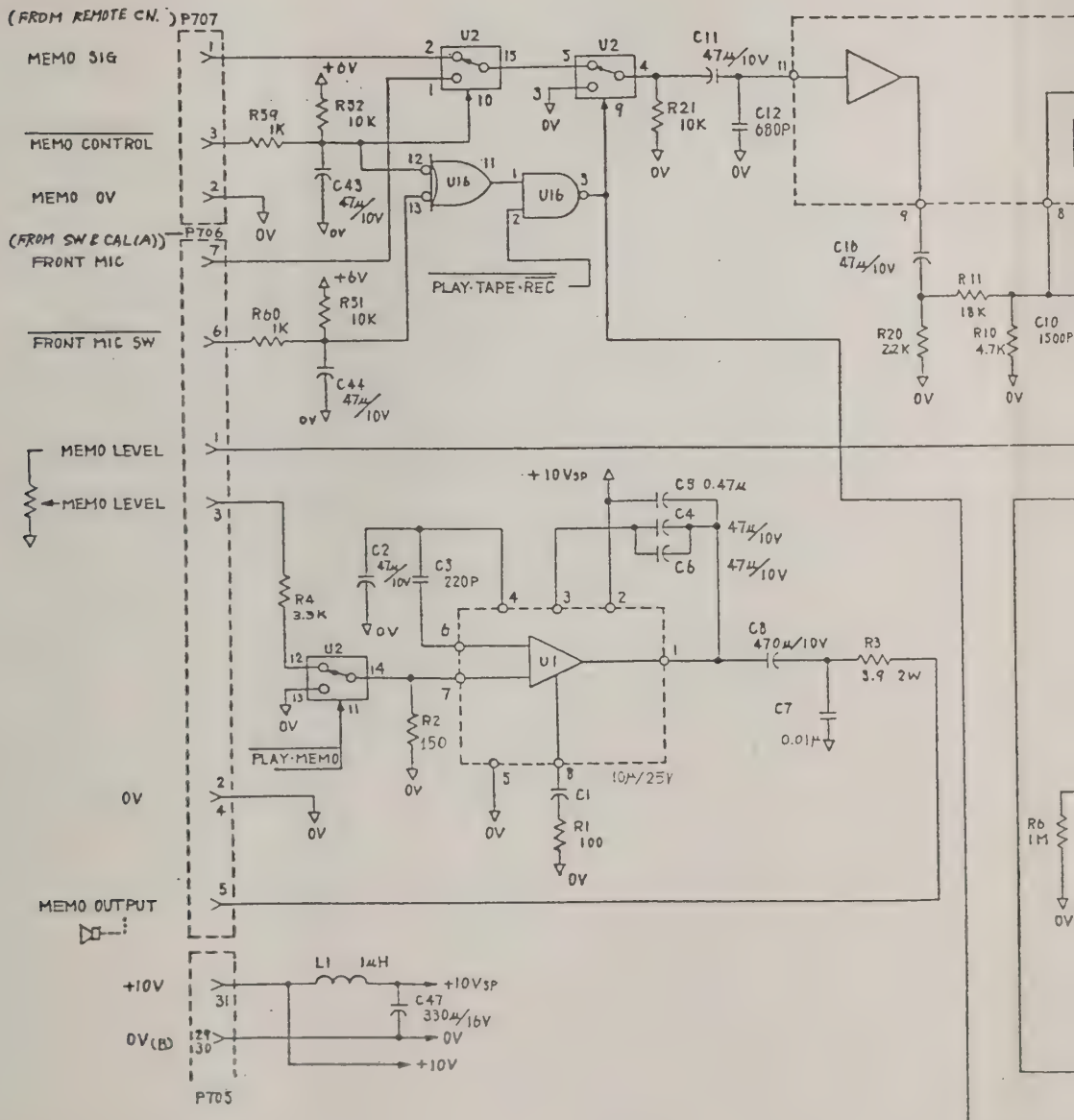
REF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
		- Capacitors -		
C7,19, 21,22, 30,31	12901828	CQ 100V 0.01MF 2%	6	
TP1,TP2	13189145	Terminal TEST POINT	2	
P707	13151573	Connector 3P	1	
P706	13151575	Connector 7P	1	
P705	13120834	Connector 31P	1	

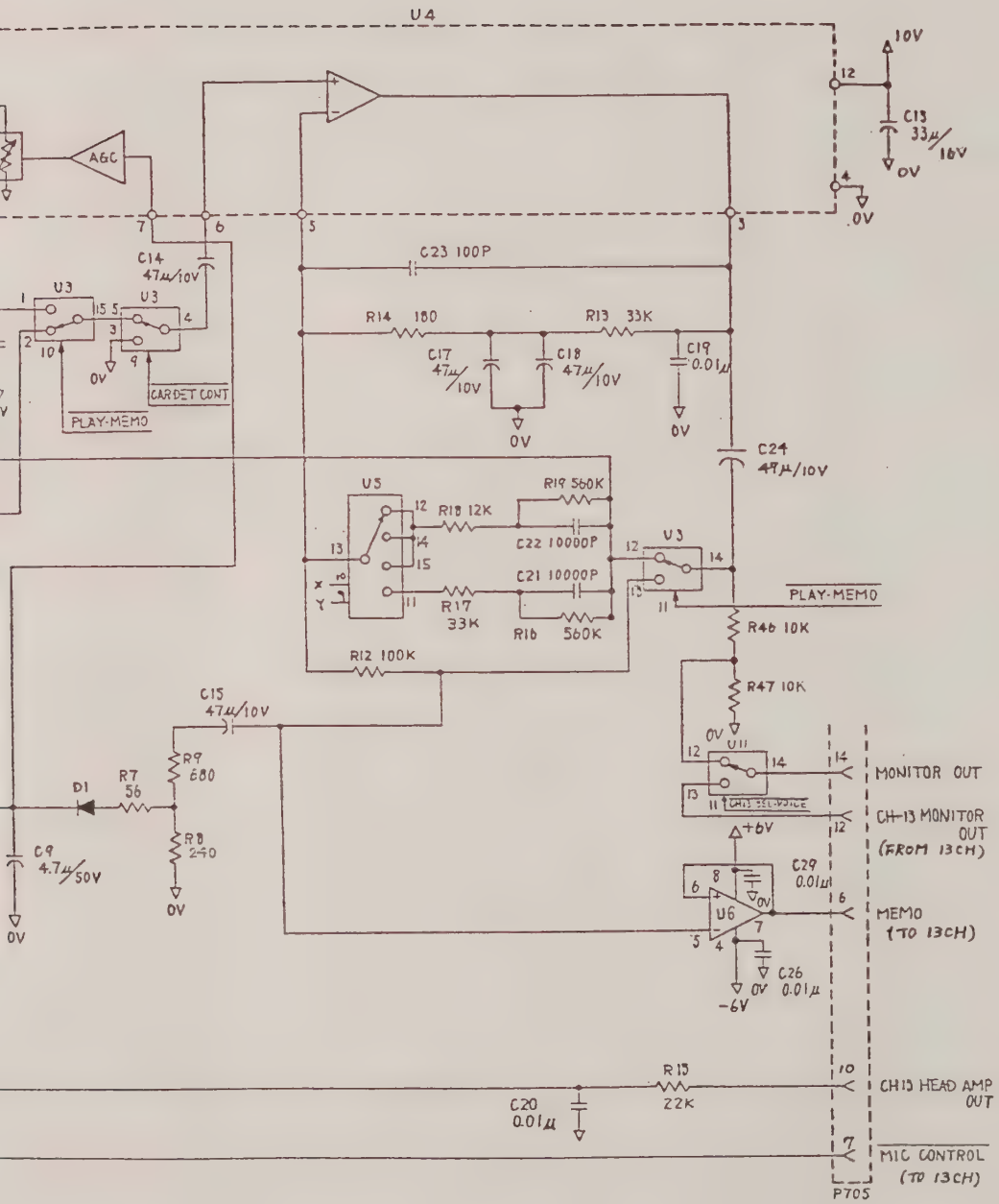
5-11-2 Schematic Diagram-1 —Monitor AMP Ass'y—




(±1%)
U5
R27 12K
R24 24K
R26 47K
R25 100K
C30 10000P
+6Vc
X
Y
D3
0V
U7
U8
D6
R61 100
R62 22K
C41 4.7μ/50V
VOICE
CAR DET CONT
U16
CH13 CAR DET CONT
P705
21
CAR DET SIG
TAPE
RE·REC
R23 100
R29 10K
R28 1K (±1%)
R30 10K (±1%)
D2
C31 10000P
R31 100K(±1%)
+6VD
D5
R54 2.2K
R53 2.2K
C42 47μ/10V
CAR DET 0
CAR DET CONT
(DELAY = 100~200mS)
17
COMP SIG OUT
CAR DET CONT
U15
CH13 SEL·VOICE
R WISE SPECIFIED ALL
N OHMS ±5% 1/4W
RS IN FARADS
+6V
D7
R63 22K
15
COMP ON
R54 470K
R101 50K
(1/2W±1%)
-6V
R58 820K
R57 9.1K(±1%)
C39 0.01μ
TP1
U12
18
COMP SIG IN
U11
R56 1K(±1%)
R53 1K (±1%)
C40 0.01μ
TP2
27
0V (COMP)
20
CAR DET CONT
CAR DET CONT
19
CH13 CAR DET CONT
CH13 CAR DET CONT
P705

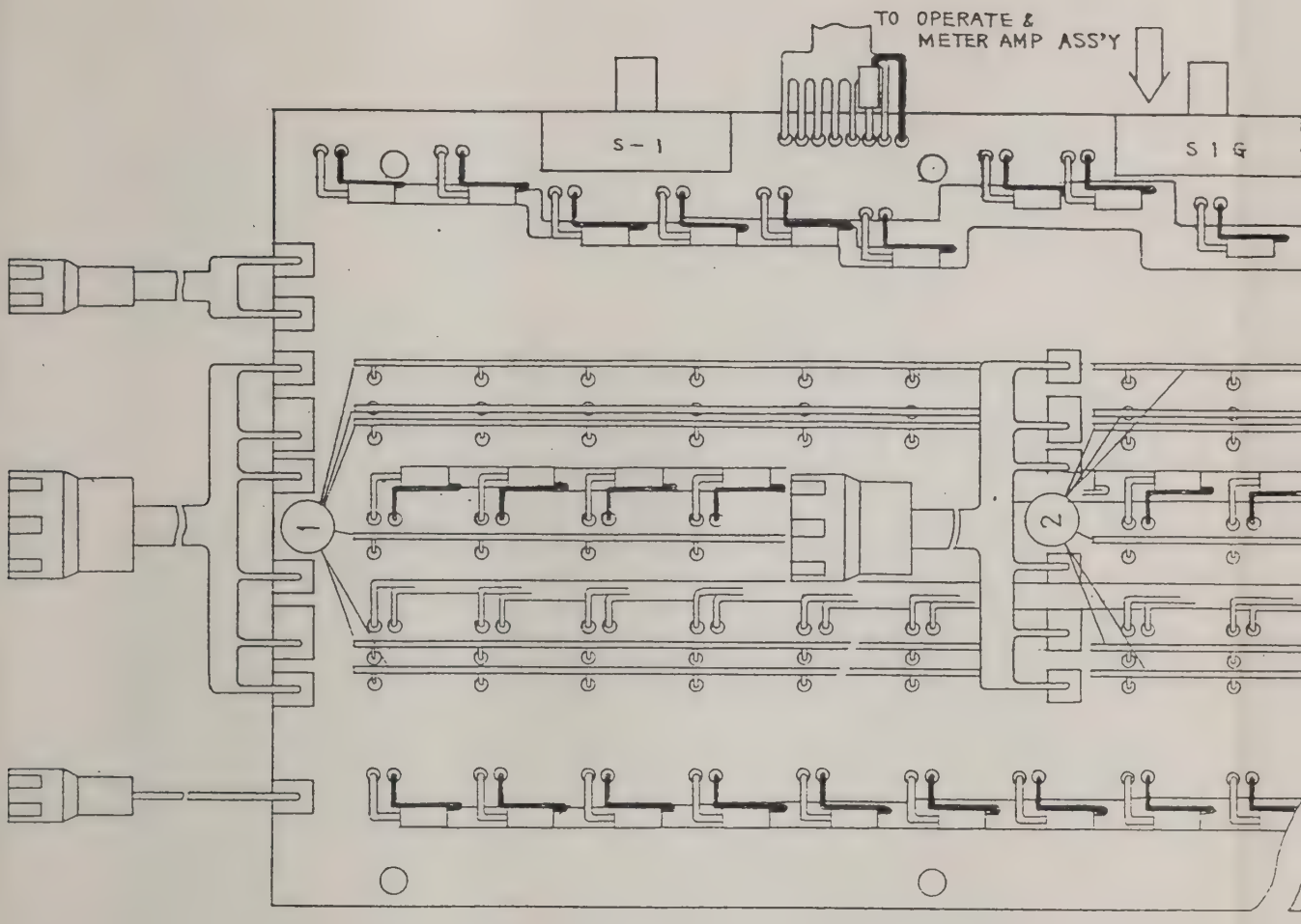
Schematic Diagram-2 —Monitor AMP Ass'y—

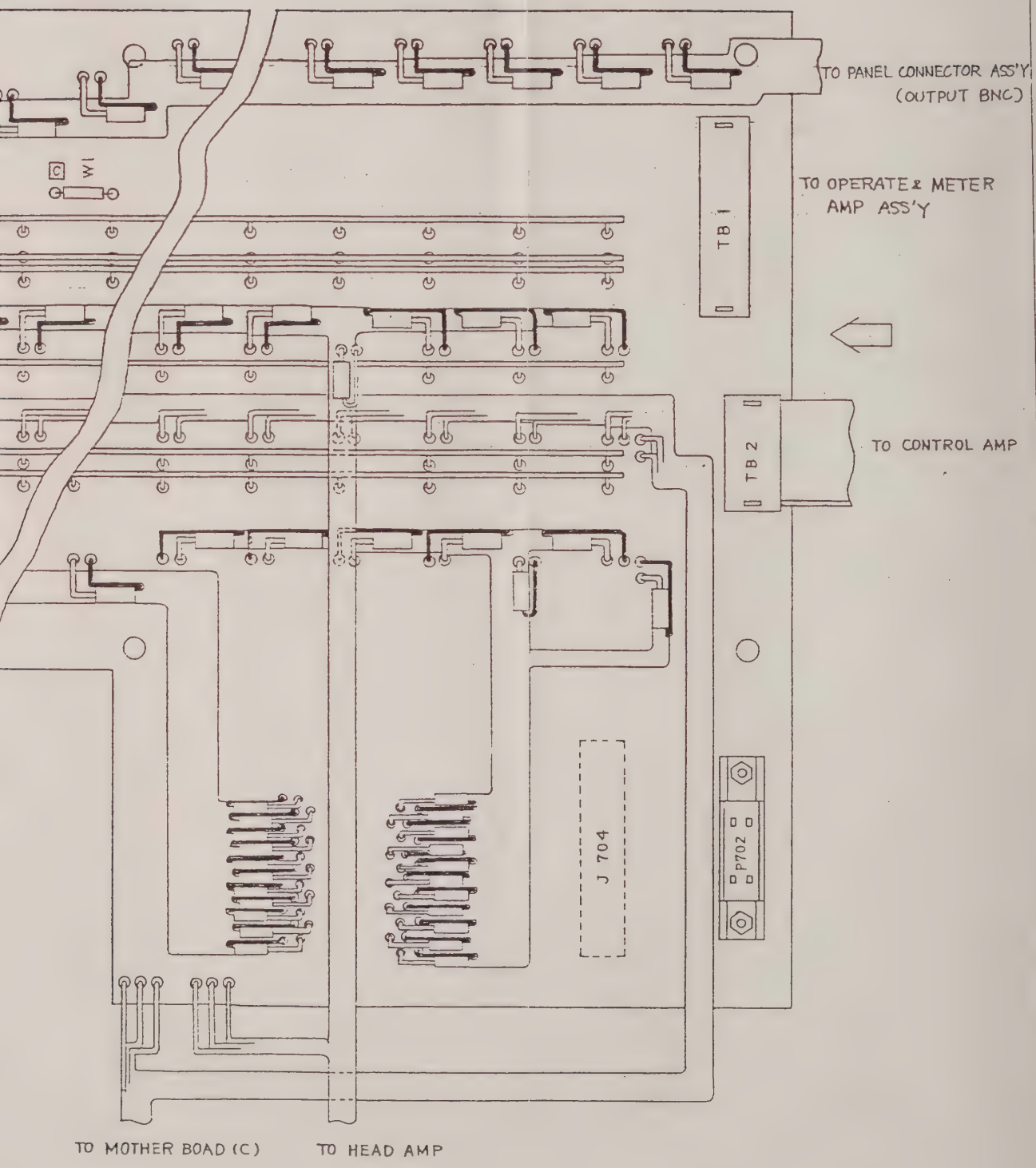



U4
AGC
10V
C13 33μ/16V
0V
.0V
C14 47μ/10V
C23 100P
U3
R14 180
R13 33K
C17 47μ/10V
C18 47μ/10V
C19 0.01μ
CARDET CONT
PLAY-MEMO
C24 47μ/10V
U5
R18 12K
R19 560K
C22 10000P
C21 10000P
R17 33K
R16 560K
R12 100K
R46 10K
R47 10K
C15 47μ/10V
R9 680
R7 56
R8 240
D1
C9 4.7μ/50V
U11
CH13 SELECT
+6V
C29 0.01μ
U6
C26 0.01μ
-6V
MONITOR OUT
CH-13 MONITOR OUT (FROM 13CH)
MEMO (TO 13CH)
R15 22K
C20 0.01μ
CH13 HEAD AMP OUT
MIC CONTROL (TO 13CH)
P705

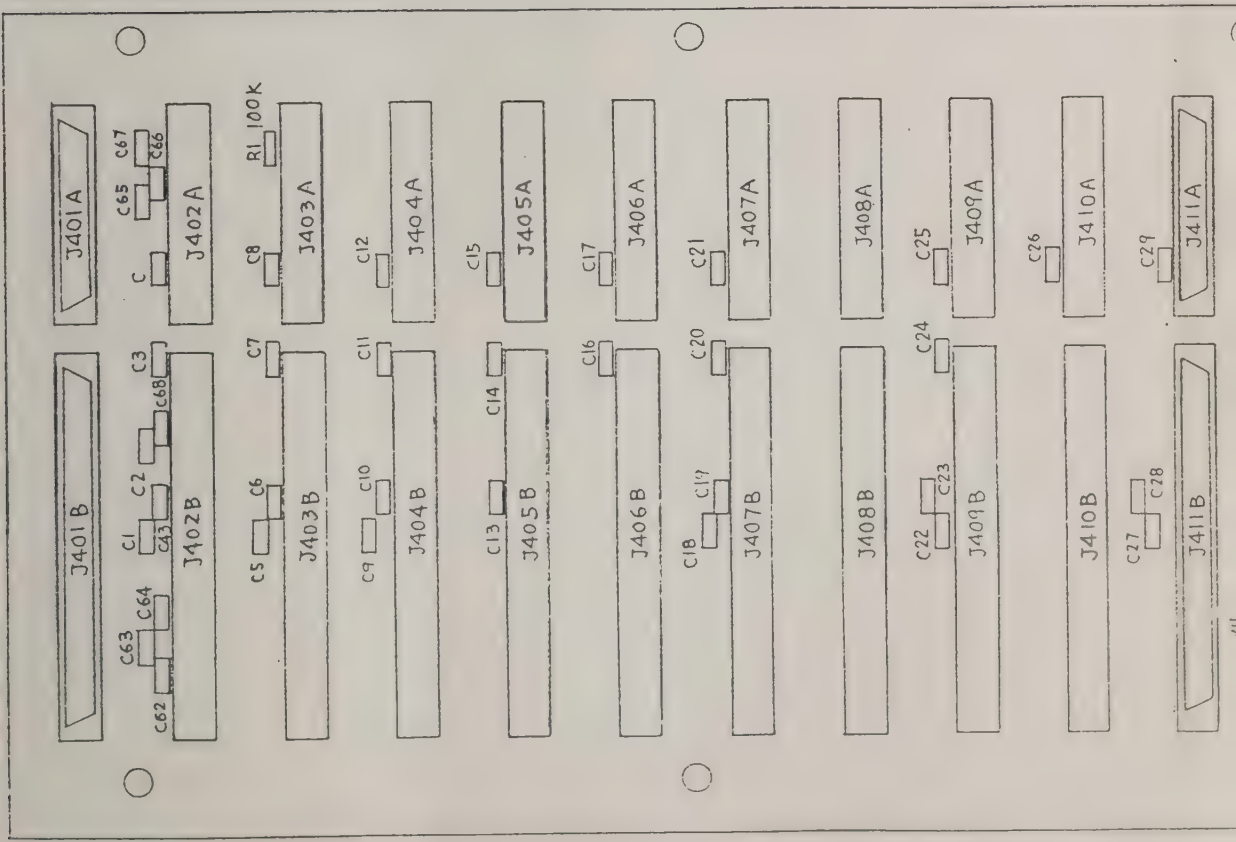
5-12 MOTHER BOARD ASS'Y

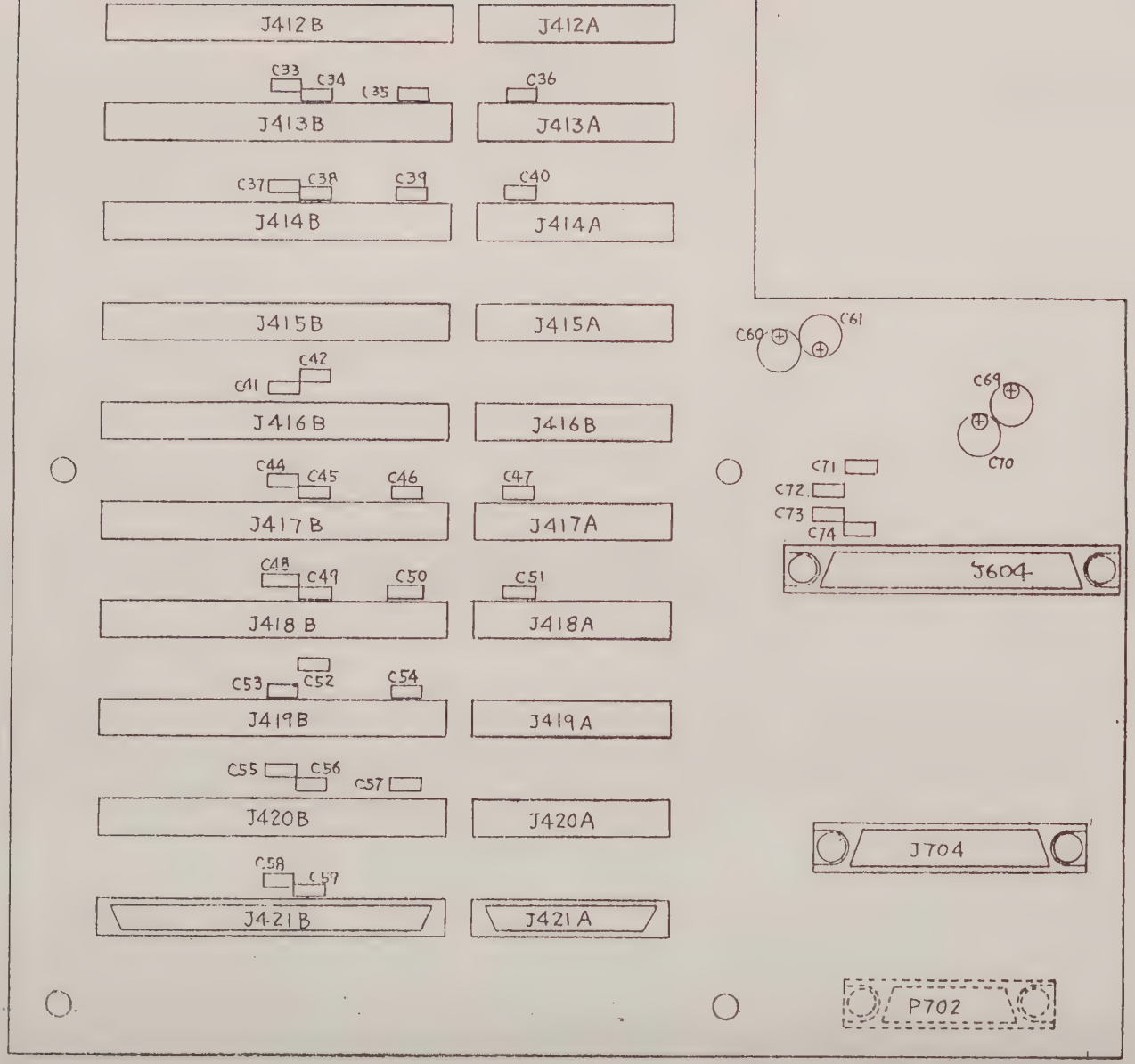
5-12-1 Connection Diagram




TO PANEL CONNECTOR ASS'Y
(OUTPUT BNC)
TO OPERATE & METER
AMP ASS'Y
TB 1
TB 2
TO CONTROL AMP
J 704
P702
TO MOTHER BOAD (C)
TO HEAD AMP

5-12-2 MOTHER BOARD (A) PCBA (15552487-00)

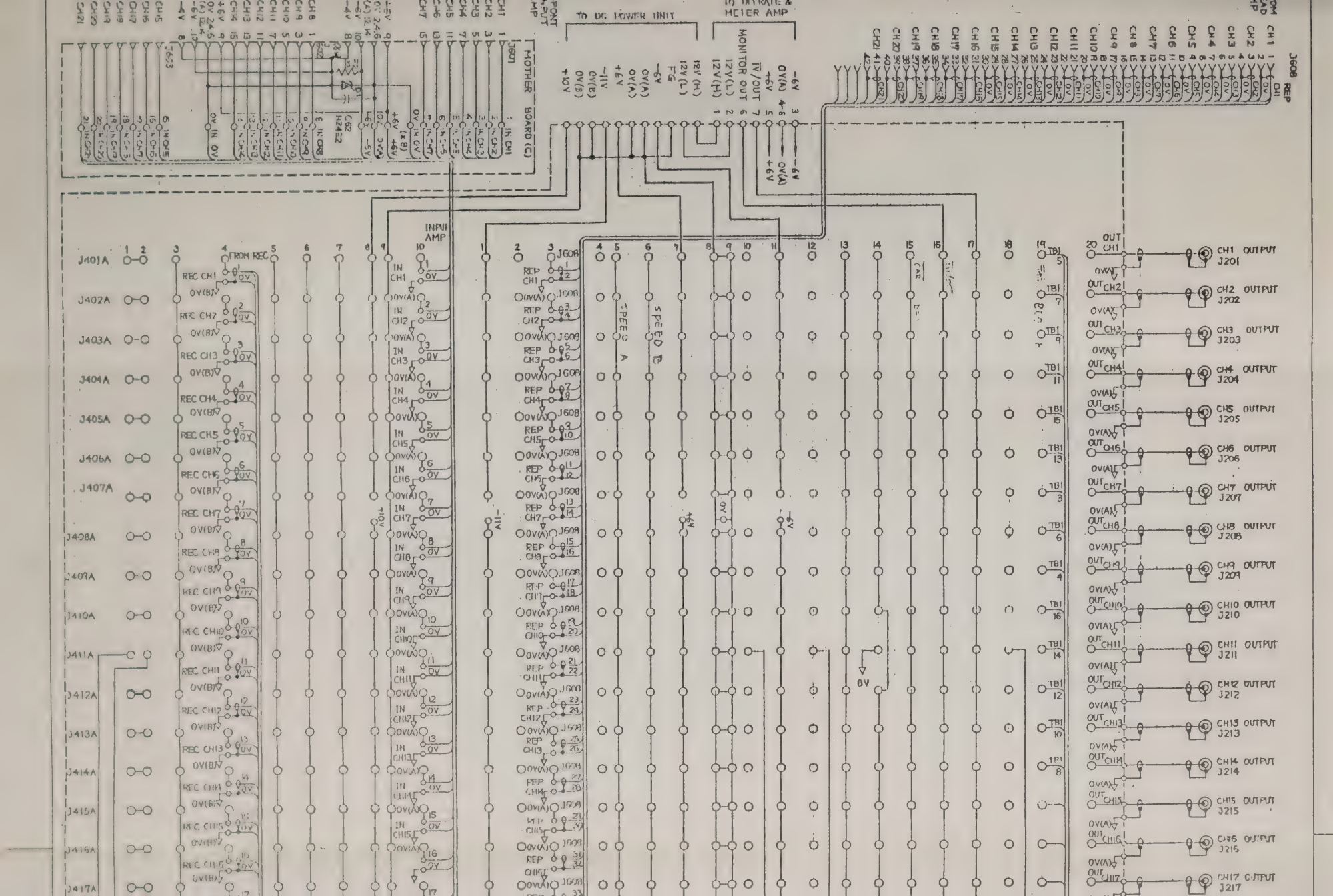



J412B
J412A
C33
C34
C35
C36
J413B
J413A
C37
C38
C39
C40
J414B
J414A
J415B
J415A
C41
C42
J416B
J416B
C44
C45
C46
C47
J417B
J417A
C48
C49
C50
C51
J418B
J418A
C53
C52
C54
J419B
J419A
C55
C56
C57
J420B
J420A
C58
C59
J421B
J421A
C60
C61
C69
C70
C71
C72
C73
C74
J604
J704
P702

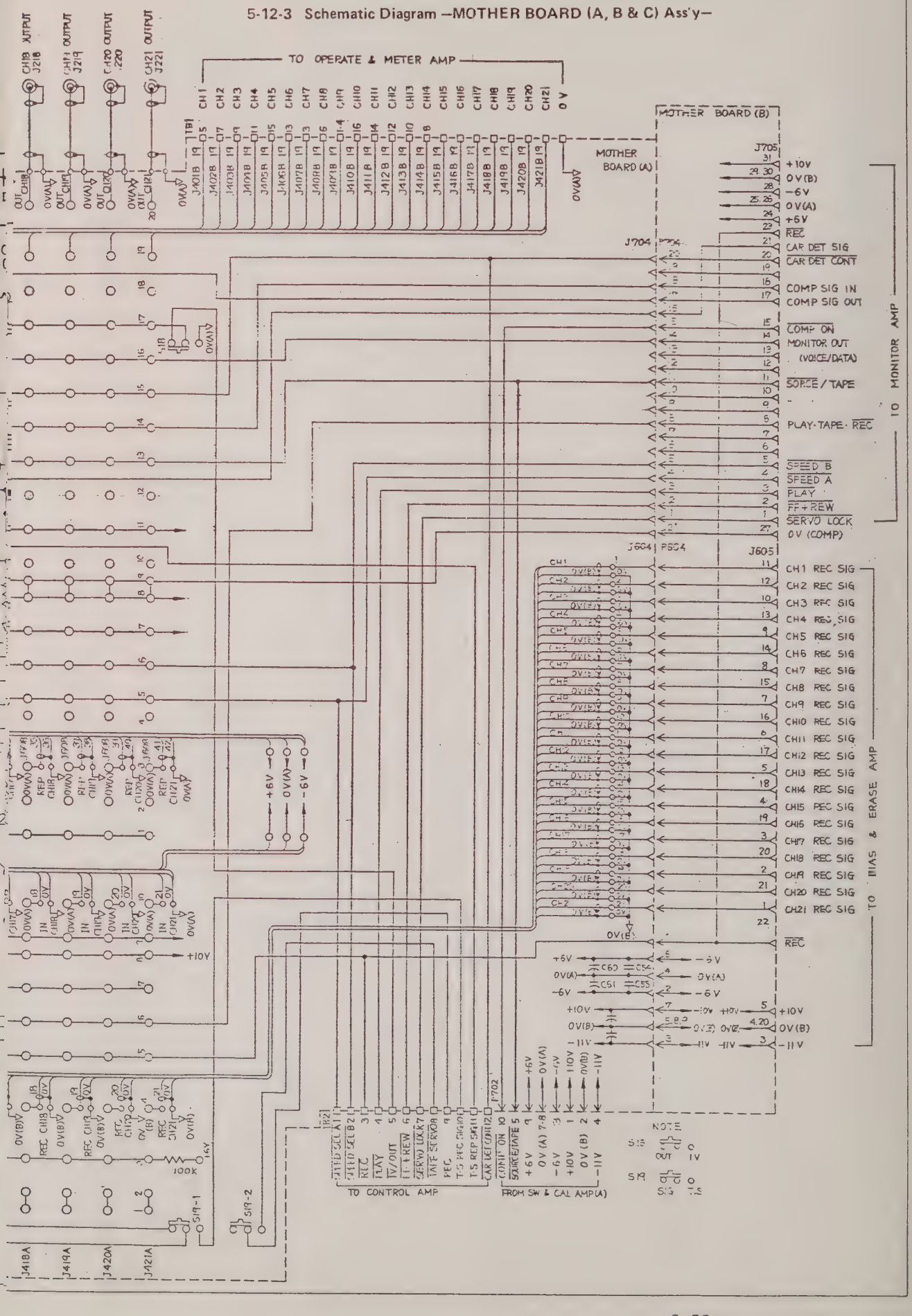
MOTHER BOARD (A) Ass'y

Parts marked with an * require longer delivery time.

REF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
W1	13040255	Wire, Jumper	1	
S18,19	13224113	Switch, Slide SSB TYPE 1	2	
		- Capacitors -		
C1~59, C71~74, C62~68.		CC 50V 0.01MF	70	
C60,61	12081107	CE 10V 100MF	2	
C69,70	12902015	CE 16V 47MF	2	
P702	13120964	Connector 10P FAP-10-07 #4	1	
J704	13120824	Connector 23P	1	
J401A~ J421A	13150845	Connector 10P	21	
J401B~ J421B	13150851	Connector 20P	21	
TB1	13120528	Connector 26P	1	
J604	13120826	Connector 31P	1	
R1	11037104	Resistor RN 1/4W 100k ohm 1%	1	
MOTHER BOARD - B ASS'Y				
P704	13120814	Connector 23P	1	
J705,706	13120826	Connector 31P	2	
J606	13150836	Connector 20P	1	
P604	13120816	Connector 31P	1	
MOTHER BOARD - C ASS'Y				
J601,602, 603	13150848	Connector 15P	3	
R2	11195330	Resistor RD 1/2W 33 ohm 5%	1	
D1	13415163	Zener Diode HZ4B2	1	
C62	12900794	Capacitor CE 10V 47MF	1	

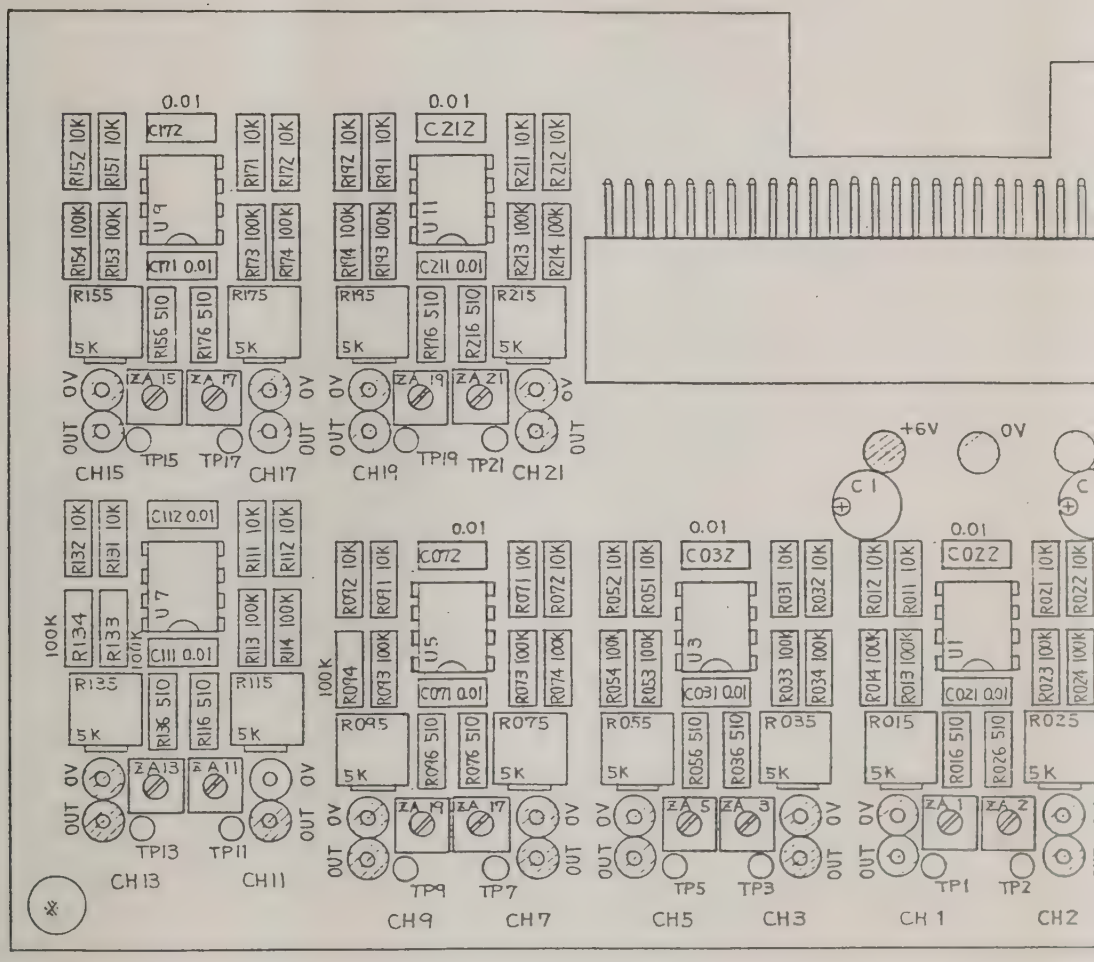

MOTHER BOARD (C)
J603
J601
TO DC POWER UNIT
TO INTEGRATE & METER AMP
MONITOR OUT
J608 REP
INPUT AMP
FROM REC
J401A
J402A
J403A
J404A
J405A
J406A
J407A
J408A
J409A
J410A
J411A
J412A
J413A
J414A
J415A
J416A
J417A
SPEED A
SPEED B
CH1 OUTPUT J201
CH2 OUTPUT J202
CH3 OUTPUT J203
CH4 OUTPUT J204
CH5 OUTPUT J205
CH6 OUTPUT J206
CH7 OUTPUT J207
CH8 OUTPUT J208
CH9 OUTPUT J209
CH10 OUTPUT J210
CH11 OUTPUT J211
CH12 OUTPUT J212
CH13 OUTPUT J213
CH14 OUTPUT J214
CH15 OUTPUT J215
CH16 OUTPUT J216
CH17 OUTPUT J217

5-12-3 Schematic Diagram —MOTHER BOARD (A, B & C) Ass'y—



5-13 HEAD AMP ASS'Y

5-13-1 PCBA (15552486-00)



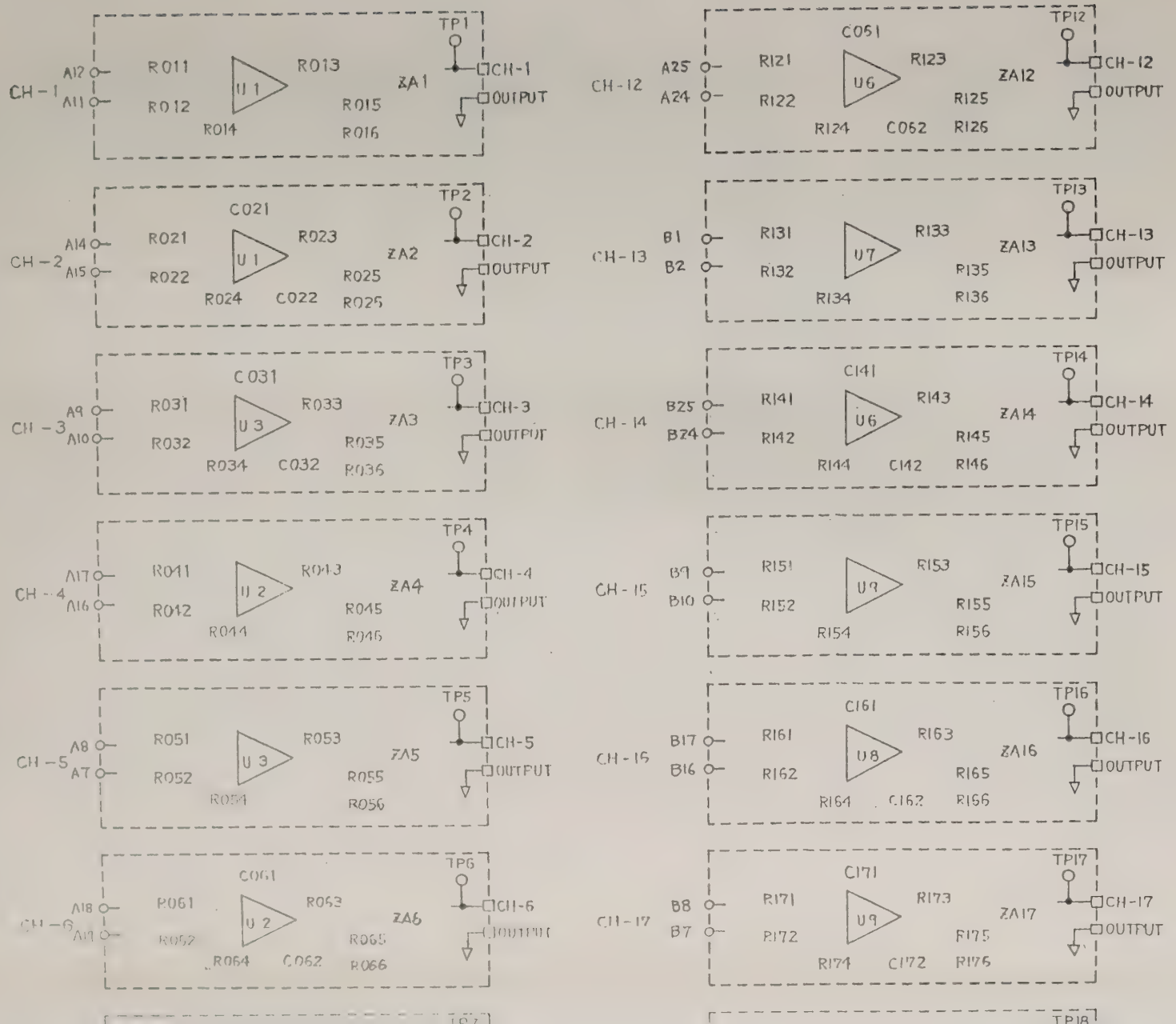
P601
-6V
0.01
C202
U10
C201 0.01
R222 10K
R221 10K
R224 100K
R223 100K
R201 10K
R202 10K
R203 100K
R204 100K
R225
5K
R226 510
R206 510
R205
5K
ZA22
ZA20
OUT 0V
TP22
TP20
CH22
CH20
0.01
C162
U8
C161 0.01
R182 10K
R181 10K
R184 100K
R183 100K
R161 10K
R162 10K
R163 100K
R164 100K
R185
5K
R186 510
R166 510
R165
5K
ZA18
ZA16
OUT 0V
TP18
TP16
CH18
CH16
0.01
C062
U2
C061 0.01
R042 10K
R041 10K
R044 100K
R043 100K
R061 10K
R062 10K
R063 100K
R064 100K
R045
5K
R046 510
R066 510
R065
5K
ZA 4
ZA 6
OUT 0V
TP4
TP6
CH4
CH6
0.01
C102
U4
C101 0.01
R082 10K
R081 10K
R084 100K
R083 100K
R101 10K
R102 10K
R103 100K
R104 100K
R085
5K
R086 510
R106 510
R105
5K
ZA 8
ZA 10
OUT 0V
TP8
TP10
CH8
CH10
0.01
C142
U6
C141 0.01
R122 10K
R121 10K
R124 100K
R123 100K
R141 10K
R142 10K
R143 100K
R144 100K
R125
5K
R126 510
R146 510
R145
5K
ZA 12
ZA 14
OUT 0V
TP12
TP14
CH12
CH14

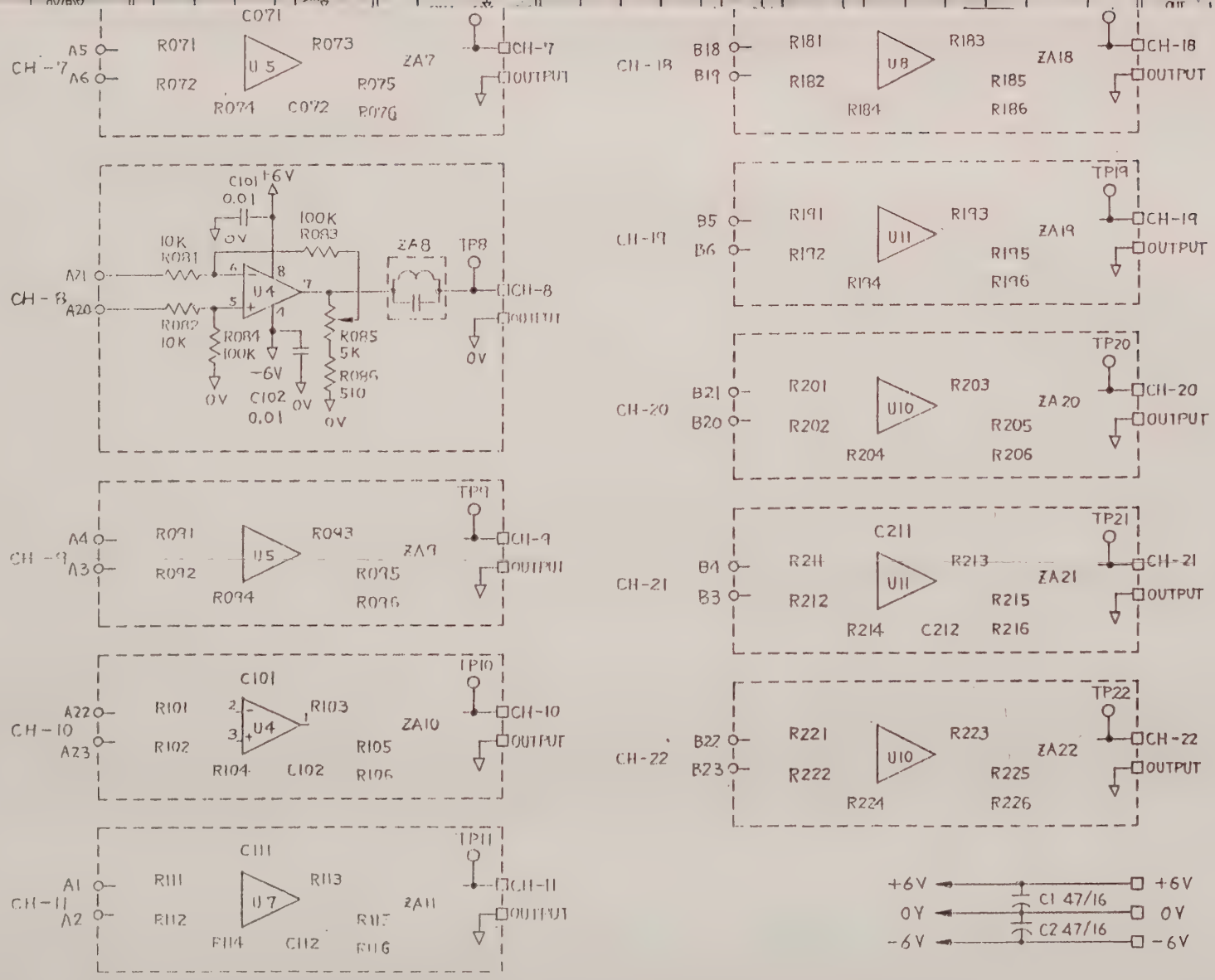
Parts marked with an * require longer delivery time.

REF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
		- Resistors -		
R011,012, 021,022, 031,032, 041,042, 051,052, 061,062, 071,072, 081,082, 091,092, 101,102, 111,112, 121,122, 131,132, 141,142, 151,152, 161,162, 171,172, 181,182, 191,192, 201,202, 211,212, 221,222.	11037103	RN 1/4W 10 ohm 1%	44	
R013,014, 023,024, 033,034, 043,044, 053,054, 063,064, 073,074, 083,084, 093,094, 103,104, 113,114, 123,124, 133,134, 143,144, 153,154, 163,164, 173,174, 183,184, 193,194, 203,204, 213,214, 223,224.	11037104	RN 1/4W 100 ohm 1%	44	

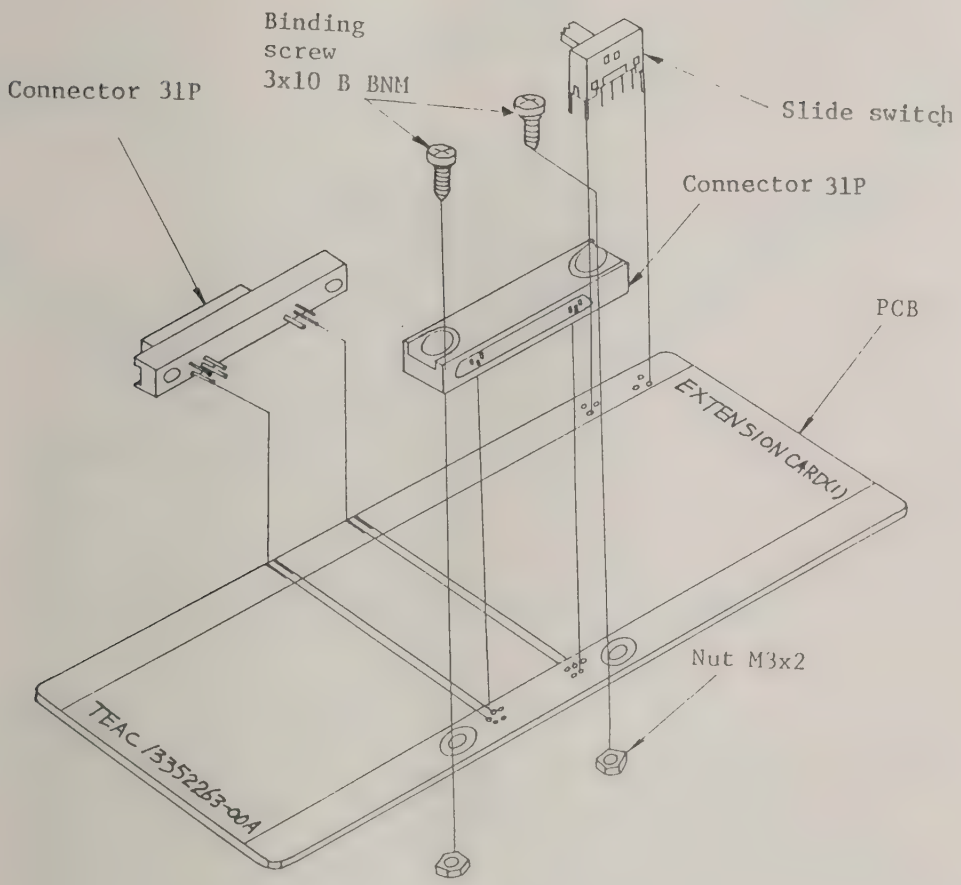
Parts marked with an * require longer delivery time.

REF. NO.	PARTS NO.	DESCRIPTION	Q'TY	REMARKS
		- Resistors -		
R016,026, 136,046, 056,066, 076,086, 096,106, 116,126, 136,146, 156,166.	11037511	RN 1/4W 510 ohm 1%	22	
R015,025, 035,045, 055,065, 075,085, 095,105, 115,125, 135,145, 155,165, 175,185, 195,205, 215,225.	13256677	Variable resistor 5k ohm ±20%	22	
		- Capacitors -		
C021,022, 031,032, 061,062, 071,072, 101,102, 111,112, 141,142, 161,162, 171,172, 201,202, 211,212.		CC 50V 0.01MF	22	
C1,2	12901899	CE 10V 47MF ±20%	2	
ZA1~ZA22	14723327-00	Bias Trap	22	
TP0~TP22	13189145	Terminal, Test Point	23	
U1~U11	13447220	IC, Linear NJM 4560D-D	11	
P601	13120766	Connector 50P	1	

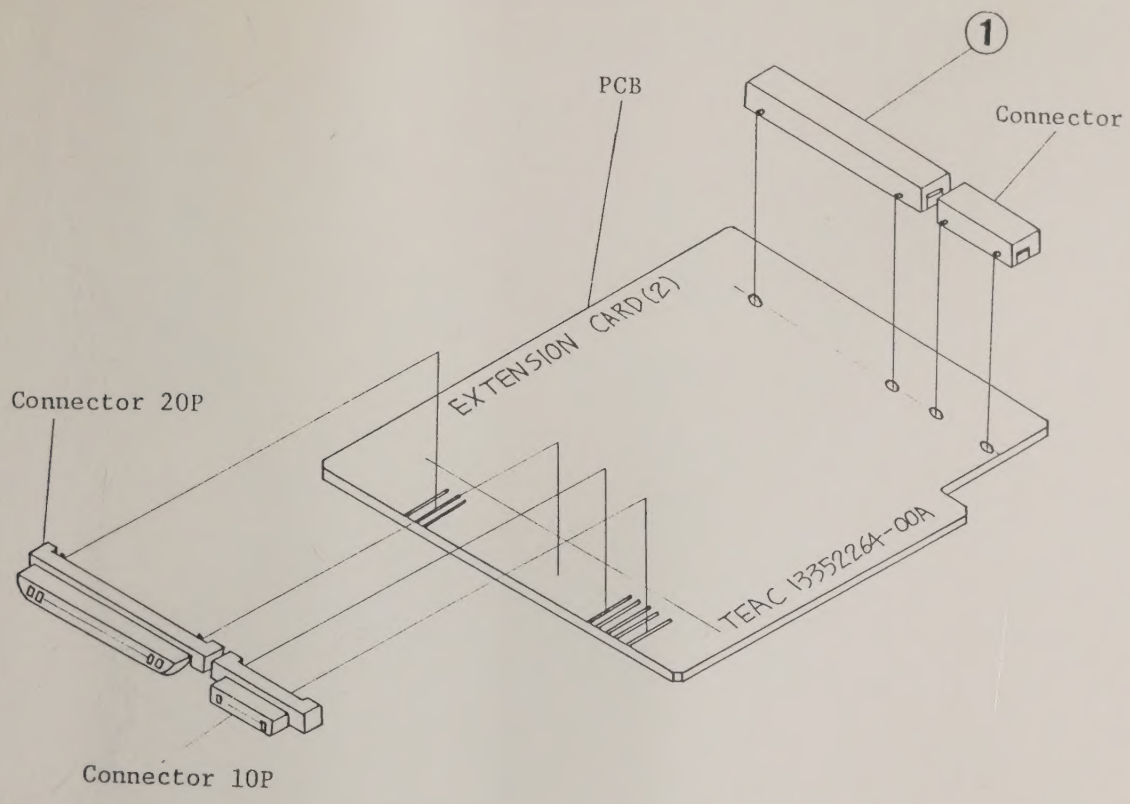

CH-1
A12
A11
R011
R012
U1
R013
R014
R015
R016
ZA1
TP1
CH-1
OUTPUT
CH-2
A14
A15
R021
R022
C021
U1
R023
R024
C022
R025
R026
ZA2
TP2
CH-2
OUTPUT
CH-3
A9
A10
R031
R032
C031
U3
R033
R034
C032
R035
R036
ZA3
TP3
CH-3
OUTPUT
CH-4
A17
A16
R041
R042
U2
R043
R044
R045
R046
ZA4
TP4
CH-4
OUTPUT
CH-5
A8
A7
R051
R052
U3
R053
R054
R055
R056
ZA5
TP5
CH-5
OUTPUT
CH-6
A18
A17
R061
R062
C061
U2
R063
R064
C062
R065
R066
ZA6
TP6
CH-6
OUTPUT
CH-12
A25
A24
R121
R122
C051
U6
R123
R124
C062
R125
R126
ZA12
TP12
CH-12
OUTPUT
CH-13
B1
B2
R131
R132
U7
R133
R134
R135
R136
ZA13
TP13
CH-13
OUTPUT
CH-14
B25
B24
R141
R142
C141
U6
R143
R144
C142
R145
R146
ZA14
TP14
CH-14
OUTPUT
CH-15
B9
B10
R151
R152
U9
R153
R154
R155
R156
ZA15
TP15
CH-15
OUTPUT
CH-16
B17
B16
R161
R162
C161
U8
R163
R164
C162
R165
R166
ZA16
TP16
CH-16
OUTPUT
CH-17
B8
B7
R171
R172
C171
U9
R173
R174
C172
R175
R176
ZA17
TP17
CH-17
OUTPUT


CH-7
A5
A6
C071
R071
R072
U5
R073
R074
C072
R075
R076
ZA7
TP7
CH-7
OUTPUT
CH-8
A21
A20
C101
0.01
+6V
0V
10K
R081
100K
R083
U4
R082
10K
R084
100K
R085
5K
R086
510
-6V
C102
0.01
ZA8
TP8
CH-8
OUTPUT
CH-9
A4
A3
R091
R092
U5
R093
R094
R095
R096
ZA9
TP9
CH-9
OUTPUT
CH-10
A22
A23
C101
R101
R102
U4
R103
R104
C102
R105
R106
ZA10
TP10
CH-10
OUTPUT
CH-11
A1
A2
C111
R111
R112
U7
R113
R114
C112
R115
R116
ZA11
TP11
CH-11
OUTPUT
CH-18
B18
B19
R181
R182
U8
R183
R184
R185
R186
ZA18
TP18
CH-18
OUTPUT
CH-19
B5
B6
R191
R192
U11
R193
R194
R195
R196
ZA19
TP19
CH-19
OUTPUT
CH-20
B21
B20
R201
R202
U10
R203
R204
R205
R206
ZA20
TP20
CH-20
OUTPUT
CH-21
B4
B3
C211
R211
R212
U11
R213
R214
C212
R215
R216
ZA21
TP21
CH-21
OUTPUT
CH-22
B22
B23
R221
R222
U10
R223
R224
R225
R226
ZA22
TP22
CH-22
OUTPUT
+6V
0V
-6V
C1 47/16
C2 47/16
+6V
0V
-6V

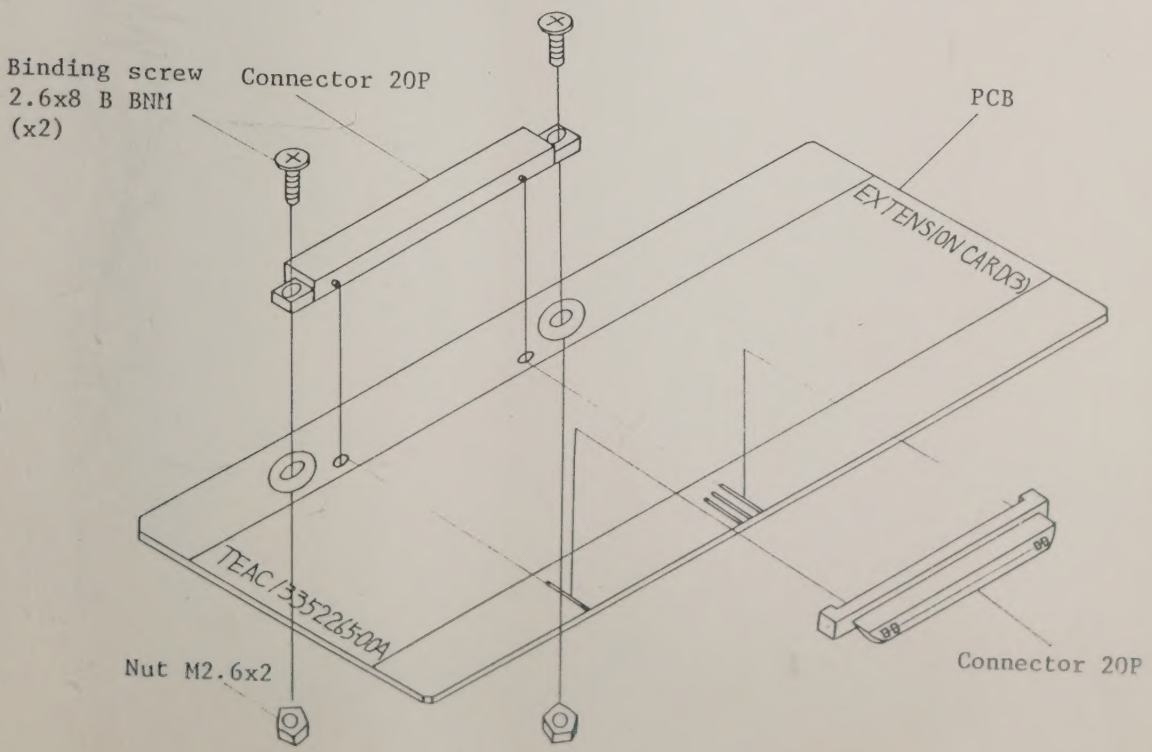
Extension Cards-1 (P/N 15552263-00) FOR MONITOR AMP



Extension Cards-2 (P/N 15552264-00) FOR FM AMP



Extension Cards-3 (P/N 15552265-00) FOR BIAS & ERASE AMP



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